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**THE EFFECTS OF IMPROVISATIONAL MUSIC THERAPY
ON JOINT ATTENTION BEHAVIOURS IN CHILDREN
WITH AUTISTIC SPECTRUM DISORDER**

2006

JINAH KIM

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**The effects of improvisational music therapy
on joint attention behaviours in children
with autistic spectrum disorder**

Thesis submitted for the degree of

Doctor of Philosophy

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Supervisor: Prof. Tony Wigram

Institute for Communication and Psychology

Aalborg University

Abstract

This research investigated the effects of improvisational music therapy on joint attention behaviours in children with autistic spectrum disorder. The study was designed to look at these behaviours in two different conditions, improvisational music therapy and free play, and use both standardized tools and DVD analysis of sessions to evaluate changes in joint attention behaviours.

A repeated measures, within subject comparison design was used and children were randomly assigned in to two groups; group 1 had music therapy first, and then free play later. Group 2 vice versa. Sessions were divided into unstructured and structured parts. There were four different types of dependent measurements; the Pervasive Developmental Disorder Behavior Inventory (PDDBI), the Early Social Communication Scales (ESCS), the Mother Play Intervention Profile (MPIP) and DVD analyses of selected session data. 10 children, all male, age between 3-6 year old, with clear diagnoses of autistic spectrum disorder completed the trial.

The overall results from the PDDBI, the ESCS and session analysis were generally in favour of music therapy over free play, indicating improvisational music therapy was more effective at improving joint attention behaviours in children than free play. The most clinically relevant and important findings were that children displayed markedly more and longer events of 'eye contact' 'joy' 'emotional synchronicity' and 'initiation of engagement' spontaneously in improvisational music therapy than free play, and also in unstructured part than structured part. The findings highlighted the 'motivational aspects' of musical interaction between the child and the therapist, and supported the long-lived claims of improvisational music therapy, promoting self-expression', emotional communication and social interaction.

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CHAPTER 1

INTRODUCTION

1.1 Background of thesis

The idea for this doctoral study has arisen from my clinical experience and the development of my own perspective in working with children with autistic spectrum disorder in improvisational music therapy. Since qualifying as a music therapist at the Guildhall School of Music and Drama, London in 1994, I have been fortunate to work mainly in the field of developmental disability and later in the early intervention area, focussing particularly on children with autistic spectrum disorder both in the United Kingdom and in Korea. Here, I would like to briefly explain my own clinical perspective and development over the years and what motivated me towards this area of research. I will start with describing one of my first clients with autism.

Sam was an eight year old boy with autism, with whom I worked for two years in the United Kingdom. I was a newly qualified music therapist, eager to work with the skills I had learnt for applying the medium of music in therapy. This child seemingly appeared to approach people around him on a daily basis. The first time we met each other, he came to me and asked my name and where I lived. I was impressed at the level of initiatives he presented even though he was rather odd. When I started working with him, I soon realized that this was one of his rituals that he did it every time he saw me for the next two years. In the early sessions of music therapy he did not play music at all and he did not allow me to make music either. He also had his own idiosyncratic behaviours. For example, he would often put his face right up to my face while pushing my chest with his hands (in that way we could not see each other at all), or he would stay away from me mostly moving around wall to wall in the therapy room. When I tried to introduce an instrument or to sing, he held my hand, or put his hand to my mouth and said firmly “don’t”, as if the sound and my attempt to invite him via music disturbed his equilibrium. He was not only extremely controlling, but he also puzzled me.

The first meaningful interaction started when he curled up his body in a foetal position on the floor. Sam seemed to be wrapped up in his bodily sensation pushing his tummy in and out, jargoning dreamingly and tapping the radiator. I imitated back his sounds when there was a silence. Sam soon noticed and began to initiate different ways of rhythmic interaction in a turn-taking form. This was quite similar to early non-verbal musical interaction where initiation and imitation are happening between infants and mothers. Sam appeared to be engaged musically and responded readily in this form of non-verbal interaction, where he was in control of what was happening and what to expect. Musical matching of this kind certainly promoted initial emotional contact with Sam. Therefore I was inspired to work further with the musical medium. However, soon I encountered difficulties in working with Sam.

Sam found musical matching not only bearable, but also very exciting. He seemed to perceive the therapist's musical matching to him as a sign of us merging as one. This seemed to fill him with a thrill and excitement and he began to display highly sensualized behaviours in music therapy. He became obsessed with keeping this musical oneness going in many aspects. He began to bring the drum and wanted us to play exactly the same way. Then after the musical interaction, he laid himself down on the floor and made a clear gesture of having sexual intercourse, and made a clear gesture of giving birth to a baby. In his highly aroused state, he told me to lie down on the floor, which I refused.

The initial pleasure and joy he found in mutual sound exchange and mutual music making started to become ritualized and explicitly sexualized in his play like this. I was utterly at a loss of what to think of his world and how to deal with his overtly sexualized behaviour in music therapy. To a certain degree, a psychoanalytic foundation for observing and interpreting what might be the child's experience helped me in working with clients presenting exceptional and challenging behaviour, including children with ASD at that time. In retrospect, it was partly my own puzzlement over the children with ASD that guided me into a psychoanalytic way of working. I found Francis Tustin and Anne Alvarez's writing very helpful since they offered comprehensive, in depth explanations into the inner world of the children from developmental perspectives. Personally and professionally I was deeply into psychoanalysis that I followed psychotherapy courses in London while working as music therapist. I was under three different supervisors including a music therapist, a child psychotherapist, and a group psychotherapist. In some ways this represents something about me and my own needs, rather than my client's, although therapists in their early career are required to undertake supervision of their clinical work. Consequently, as a therapist, I needed additional help in clarifying the complex processes occurring in therapy sessions, the client-therapist relationship, and in dealing with issues that the client brings into therapy sessions, both musically and psychologically. Undergoing supervision both in music therapy and child psychotherapy was a complimentary experience. While a psychoanalytic approach helped me to deal with my own counter-transference over those issues that concerned the child, music therapy supervision helped me to focus on the here-and-now and work intuitively through my own musical resources with clear objectivity. This particular experience with one of the first autistic clients was described in my M.A dissertation "The shared experience of music therapy with the autistic child – viewed from a psychodynamic perspective."

The shared experience found in a mutual music making process, and an interpersonal relationship in music therapy have always been critical elements in the treatment of autistic children since the main difficulties of the child lie in their inability to maintain effective emotional communication and interpersonal relationship with others.

I have also learned from research findings in the field of autism that there are many things the clinicians could learn from normally developing infants and their mothers, as autism is a lifelong complex developmental disorder characterised by a wide variety and individuality across all ages and abilities. Just as children with ASD develop over time, so has my own professional development gone through stages and

milestones. After returning to Seoul, Korea in 1996, I began to work at the department of child and adolescent psychiatry at Seoul National University Hospital, and then in a multi-disciplinary team at the Seoul Community Rehabilitation Center (SCRC) for several years. As I worked with other disciplines such as the clinical psychologist, teachers in special education, speech language therapist, occupational therapist, physiotherapist, psycho-motor therapist and play therapist, their way of working and thinking had some influence on me over the years. For four years, I ran 'the Music and Movement Therapy' together with a physiotherapist colleague at SCRC for children with cerebral palsy with secondary handicaps. As SCRC was the leading center for further education for professionals nationwide, I came across different types of new approaches in treating children with special needs. A sensory integration therapy course run by Patricia Wilbarger was just one such new approach. At that time, I was tentatively stretching my knowledge to the neurological development in infancy and neurobiological findings on autism through reading books and journals. Although it was only a theory, the neurological foundation of sensory integration therapy gave me a new perspective in dealing with clients with ASD. This also gave me the motivation to search for the literature and plan for the research, which resulted in my first proposal 'Attention, attunement and neuroendocrine activity in improvisational music therapy with the autistic children' to the Aalborg Ph.D course in 2002. This was due to the fact that I found a number of studies in psychoneuroendocrinology suggesting that there was a relationship between the attention system and social regulation of cortisol levels. As I have experienced many children with ASD displaying different levels of difficulty in participating in activities requiring attention and joint attention, later showing positive development as music therapy progressed, I thought this was a good topic for research. I was enthusiastic about the idea of measuring changes in behaviour and relating this to measurement of a major stress hormone - 'cortisol'. However, the first proposal was rejected due to the predictable difficulties in proving the hypothesis, and the complex nature of the study.

Although the first proposal was rejected, I thought the time was not wasted. I learned more about realistic expectations for doctoral research and became interested in research that would support evidence based practice. Planning the research underpinning evidence based practice on my major clinical work with children with ASD was both quite exciting and daunting since 'evidence based practice' was a new concept to me. I was stepping out into territory, with which I was not familiar. Paradoxically, that was also the precise reason why I wanted to carry out quantitative research. For once, I wanted to do something new and learn about quantitative research. Partly, this was probably due to the inherent uncertainty found within the psychoanalytic way of thinking and working that drove me towards a more concrete and certain way of doing the research. Partly, I also hoped to find out whether intra/inter musical and intra/inter personal qualitative work could be quantifiable.

The current topic of the doctoral study was partly derived from my first proposal. It is in a way a continuation of the thinking that emerged from my M.A dissertation, since joint attention is the basic building block for the shared experience between the therapist and the child that enables the therapist and the child to make a

connection, to communicate and interact. This is the very foundation that facilitates further developments of the child and therapy itself.

1.2 Focus of the study

The purpose of this study is to investigate the effect of improvisational music therapy on the joint attention¹ behaviours of children with autistic spectrum disorder (ASD). Disturbance in the development of joint attention behaviour is known to be a major characteristic of the social deficits in children with ASD (Kasari et al, 1990; Mundy, Sigman & Kasari, 1994; Mundy & Sigman, 2006; Robertson et al, 1999). There are now more and more studies identifying that a fuller understanding of this disturbance may inform both diagnosis and treatment of the children (Joseph & Tager-Flusberg, 1997; Kasari et al, 1990; McArthur & Adamson, 1996; Mundy & Sigman, 2006; Mundy, Sigman, Ungerer, & Sherman, 1986). In improvisational music therapy literature, there are many case studies and clinical reports demonstrating that the process of music therapy helps autistic individuals develop the capacity for emotional regulation, self-emotional expression, communication and social interaction (Alvin & Warwick, 1991; Brown 1994; Edgerton, 1994; Nordoff & Robbins, 1971a; Robarts, 1996; Wigram, 2002). However, there has not to date been a randomized controlled study on the effect of improvisational music therapy on joint attention behaviours of autistic children published in the literature.

I am particularly interested in shared aspects of building joint attention between the child and the therapist during engagement in the mutual music making processes and activities common in improvisational music therapy since joint attention is a basic construct for emotional, cognitive, and social development. The capacity to communicate, use language, play, symbolize, socialize and learn all develops from there. Shared aspects of building attention are particularly critical when working with the children with ASD since difficulties in social interaction involving sharing attention with another human being are frequently observed features of the core impairments and diagnostic features in young children with ASD. I am particularly interested in the interactive state of joint engagement between the therapist and the child either passive, or coordinated. A child is said to be in an interactive state with the therapist if the child opens, or maintains a communication channel with the therapist. This study aims to systematically examine the relationship between behavioural changes and the musical-interpersonal relationship in improvisational music therapy. This study focuses on observable and measurable behavioural changes directly related to a joint attention episode over the course of music therapy. In addition to measuring actual changes in joint attention behaviours over time, I would also like to focus on qualitative aspects of the mutual music making process such as the core musical features that characterize the engagement and maintaining of joint attention of the child and therapist.

¹ Working definition; Joint attention behaviour is a three-way exchange that involves the child (self), and another (the therapist), and objects either in musical form (instrumental or vocal joint engagement), or in play. This may, or may not be expressed in visual focusing between people and objects, but will display the interactive state of joint engagement either passive, or coordinated

1.3 An intervention outcome study – needs for treatment protocol and structure

Like many music therapists working in an improvisational model, I have followed the principle of ‘meeting the child where he/she is’ (Nordoff and Robbins, 1977). This principle has the common ground with the psychodynamic/ psychoanalytic approach as well. An autism expert in child psychotherapy, Anne Alvarez, also talks about ‘meeting the children where ever they are’ and continues on the importance of tuning in, and reaching the child at the right level and intensity (Alvarez, 1992). In improvisational music therapy, the concept of ‘tuning-in’, ‘meeting the child at the right level and intensity’ has been so natural that music therapists tend not consciously strive to achieve it, as we have built it into our method of work in everyday clinical practice. Music therapists have also incorporated some terms, such as ‘meeting a child in the music’ into their professional language, and forget that this type of jargon often needs explaining, particularly when it comes to understanding the musical concepts involved. Musically, this can involve matching a child’s pulse, rhythmic patterns, dynamics, melodic contours and timbre to the point where a child responds in the same way to the therapist, thus creating the effect of ‘meeting’. Infant developmental psychology studies also inform the way we should structure improvisational music therapy with autistic children. Trevarthen (2001, 2002) emphasizes the child’s need for systematic intervention facilitating cooperative, moment-to-moment motivational and interpersonal responses.

However, in order to carry out scientific measurement in this clinical research, a music therapy session must be subjected to comparison with another appropriate condition. This is highly needed in order to address the question that is often raised that when a nice, friendly and empathic person engages or ‘plays’ with children with ASD, they may start to respond positively, regardless of whether the medium is the specialised methods and techniques used in music therapy, or just someone playing with the child. For the results from the study to be accepted as reliable and valid, there must also be a treatment protocol to achieve consistency in the intervention, and to allow future researchers to replicate the study as close as can be achieved given the likely differences that will occur in improvisational music therapy (and free play) even within a defined protocol of intervention.

Therefore, in this study I have chosen a free play condition with toys to compare with the improvisational music therapy condition. I also have designed a comprehensive treatment protocol for both conditions. I tried to incorporate my own clinical experience, realistic expectations of clinical practice, the theoretical and philosophical perspectives into formulating this treatment protocol. Therefore, this is not a rigid step-by-step procedural based treatment, as I have emphasized the importance of working within the focus, interest and tolerance of the child. This will be described and discussed further in Chapter 4, the methodology Section.

1.4 Overview of thesis

In order to establish if, how and to what degree improvisational music therapy can assist the development of joint attention behaviours in the children with ASD, the

thesis starts with an overview of relevant literature. Chapter 2 begins with historical reviews on theories of autism and corresponding treatments, and then moves on to relevant studies both in infant developmental studies, joint attention theories and autism research. Chapter 2 focuses on normative developmental milestones of shared aspects of attentional process in young children as well as how it can be deviated in the children with ASD and the consequences of the developmental deviation.

The role of the music in some types of intervention, and the more specific approach of music therapy in general and improvisational approaches in the treatment of autistic spectrum disorder are the focus of the Chapter 3. This includes a brief review of published articles on clinical interventions where music was used to treat an autistic population, and then moves on to more specific and relevant reports and research studies that support this study. At the end of Chapter 3, research questions and hypothesis are presented.

Chapter 4 introduces the method employed in this doctoral study. The research design, intervention and procedure of data collection are described, with details of standardised measurement tools, and non-standardised data collection tools developed specifically for this study. A description of the recruitment of subjects and the characteristics of the subjects are included here. Preparation of the DVD, and the method of data analysis are also described.

The results section of this study is divided into two chapters. Chapter 5 presents the pooled group results of data collected throughout the clinical trial period. Group results are divided into two sections. The first section presents 'pre', 'in between', and 'post' treatment measure in three forms. The pooled results of the Pervasive Developmental Disorder Behavior Inventory (PDDBI), the Early Social Communication Scale (ESCS), and the Mother Play Intervention Profile (MPIP) are presented. The second section presents music therapy session analysis data in comparison with free play sessions. This form of presentation will be described in greater detail at the beginning of each chapter.

Chapter 6 presents qualitative data in the form of individual case studies for each of the 10 subjects, providing background information to each case, early history, the characteristics described within the first interview, and some relevant information about the mother. Also included in each case study presentation are the individual MPIP, PDDBI, ESCS data. Finally these case studies report each child's clinical vignette in both conditions and the feedback of the mothers on this music therapy clinical trial programme.

The final chapter of this thesis, chapter 7 discusses the findings of this study in relation to previous findings of other studies presented earlier in chapter 2 and 3. This constructs and builds an argument for a further study recommendation in this field. The limitations of the current study will be discussed in detail. The final chapter concludes with perspectives on the implications of these findings for clinical practice and consideration towards future directions for research in looking at the value and effect of improvisational music therapy with children with ASD.

CHAPTER 2

AUTISM AND JOINT ATTENTION

The theoretical framework of this study is based on theories of autism, infant developmental psychology, joint attention theories, findings in autism research and music therapy. The theory section deals with relevant literature on autism and music therapy, and is therefore divided into two chapters. While Chapter 3 describes music therapy in autism, Chapter 2 begins with an historical and theoretical review on autism, and on some currently implemented treatments, and then discusses the development of joint attention in normally developing infants and joint attention deficits found in children with ASD, discussing the possible effective ways of facilitating the development of joint attention abilities in children with ASD.

2.1 Theories of autism

Autism is now considered a neurodevelopmental disorder that begins in early childhood and persists throughout adulthood. Autism is found across all races, socio-economic background and all levels of intelligence. This organic pervasive developmental disorder affects three crucial areas of development; social communication, social interaction and creative, or imaginative play (Wing, 1988a). However, there is no single identified disruption in brain function found to be accountable for all cases of autism (Baron-Cohen & Bolton, 1993). Therefore, the aetiology of autism remains largely inconclusive. Gold, Wigram and Elefant (2006, p.2) stated; “Autistic spectrum disorder (ASD) is the core disorder of the pervasive developmental disorders as defined within the International Classification of Diseases and Related Health Problems, tenth edition (ICD-10) (WHO 1992) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (APA 1994)”. In many countries, autistic spectrum disorder includes low and high functioning autism as well as Asperger syndrome. In the USA, the terminology of autism spectrum disorder is more often used than autistic spectrum disorder. In the USA, autism spectrum disorder is used as an umbrella term for autism, Asperger syndrome and Pervasive Developmental Disorder Not Otherwise Specified (PDDNOS). In this study, the terminology of autistic spectrum

disorder will be used that includes both low and high functioning autism and Asperger Syndrome.

A vast number of research studies and an extensive literature have emerged over the last 60 years on autism (Baron-Cohen & Bolton, 1993; Baron-Cohen, 2003; Frith, 1989; Hobson, 1993; Howlin & Rutter, 1989; Lathe, 2006; Trevarthen et al, 1996, 1998). Some of these theories and treatments, which have been used and are regarded as historical or major influences on contemporary concepts of autism, are discussed below.

2.1.1 The aetiology of autism

Autism experts have long been disputing the primary causes of autism. Dr. Leo Kanner (1943) was the first to officially recognize autism. He studied a group of 11 children at Johns Hopkins Hospital and introduced the label of early infantile autism. His initial description of the children is very insightful, and is still applicable to the current concept of autism;

“These children have come into the world with an innate inability to form the usual biologically provided affective contact with people just as other children come out into the world with an innate physical or mental handicap” (cited in Howlin and Rutter, 1989, p.10).

However, in the 1950s due to the abnormal features of the children’s relationship with their parents, psychoanalytic theory of ‘early emotional trauma in infancy and childhood’ began to convince many professionals (Howlin & Rutter, 1989). Autism was thought to be the attachment disorder caused by inadequate care by the parents (Bettelheim, 1967), or ‘the combination of an unresponsive child and mother’ (Anthony, 1958). Kanner (1949) also changed his original view on autism and considered the possibility of parents’ contribution to the disorder. During the 1950s and 1960s, the notion of ‘refrigerator mothers’ prevailed and influenced perception and treatment of autistic children. Subsequent research studies, however, found no evidence to support the theory that psycho-social stressors ‘cause’ autism, nor the consequential notion that psychotherapeutic treatment would therefore help ameliorate the symptoms found in autistic children.

Instead from the 1970s’ on, researchers began to pay more attention to organic factors such as perinatal complication, motor and sensory abnormality and late onset of epilepsy in autism (Damasio & Maurer, 1978; Dawson & Lewy, 1989a; Deykin & MacMahon, 1979). Individuals with autism often have secondary handicap; majority

(approximately 75 %) of the autistic population is of below average intelligence and has language deficits (Trevvarthen et al, 1996). Siblings of autistic children are much more likely to have disabilities such as language delay, mental retardation and pervasive developmental disorders than general population (August et al, 1983).

Moreover, there has been an overwhelming accumulation of research evidence suggesting neurophysiological disturbances as crucial in the causation of autism. Autism-specific abnormality in brain structure, neurophysiological function and development were reported as follows (Boddaert et al, 2004; Brothers, 1990; Dawson and Lewy, 1989a; Frith and Frith, 2001; Gendry Meresse et al, 2005; Mundy et al, 2000; Mundy, 2003; Zilbovicius et al, 1995, 2000):

Brothers (1990) first introduced the concept of a ‘social brain’ explaining that amygdala, orbitofrontal and medial frontal cortex, superior temporal sulcus and gyrus had the complex integrating functions of social intelligence. The severity of autism was reported to have a link with temporal lobe dysfunction (Gendry Meresse et al, 2005). The delayed maturation of frontal cortex was reported in a sample of children aged between three and four years old with ASD (Zilbovicius et al, 1995). Mundy located a disturbance of the frontal brain activity, especially medial frontal cortex as the basis of social impairment of autism. The medial frontal cortex has been associated with social cognition, self-monitoring, regulation of attention and social motivation processes (Frith & Frith, 2001; Mundy, 2003). A group of neurobiology researchers (Boddaert et al, 2004) found an anatomical abnormality in the superior temporal sulcus (STS) in children diagnosed with autism. As the STS has recently been recognized as a key cortical area of the ‘social brain’, this study (Boddaert et al, 2004) supported the earlier theory of the ‘social brain’. A study by Mundy and his colleagues (2000) suggested that initiation of joint attention skills was associated with medial frontal activity, and response to joint attention bids may be associated with the parietal system. Therefore, understanding brain-behaviour relationship linked to anatomical and functional abnormalities observed in autism seems crucial in working with children with ASD. Then what are the primary causes of these anatomical and functional abnormalities of brain development in autism? A congenital defect in reticular system of the brain core and limbic system, which plays an important role in regulation of brain development, was proposed as the pathogenesis of autism with ‘immediate and lasting effects in socio-emotional aspects of behaviours’ (Lathe, 2006; Trevvarthen et al, 1996, 1998).

The recent and fascinating claims (hypothesis) on the aetiology of autism came out of a group of researchers led by Simon Baron-Cohen at the autism research centre,

University of Cambridge. They have claimed that testosterone is the biological basis for the prenatal development of the autistic child, beginning in the womb where some babies receive an exceptional high dose of the testosterone, leading to the “extreme maleness” of the brain (Baron-Cohen, 2003 ; Knickmeyer et al, 2005; Knickmeyer et al, 2006; Manning et al, 2001).

In the past few years, there has also been a dispute over the possibility of a link between the use of thimerosal, a mercury-based preservative used in the measles-mumps-rubella (MMR) vaccine and autism. This caused serious concerns on parents about vaccinations. However, a large scale Danish study concluded that childhood vaccination using thimerosal-containing vaccines had no causal relationship with the development of ASD (Madsen et al, 2003).

The most recent claim on autism is that a toxic environment may play a role in genetic predisposition of autism. Lathe (2006) proposes in his recent controversial new book that recent rises in cases of ASD is due to “increased exposure to environmental toxicity combined with genetic predisposition”. He further contends that autism is a disorder of the limbic brain, which is damaged by toxic heavy metals increasingly present in the environment.

Concerning the aetiology of autism, the argument seems to evolve in two directions; genetic cause, or ‘an abnormal environment of the brain, either in body, or coming from external stimuli’ (Dawson et al, 2002; Lathe, 2006; Trevarthen et al, 1996, 1998). In other words, autism can be originated by various ways that Trevarthen and his colleagues explained (1996, p. 49); “..by a fault in genetic instructions for formation of specific systems in brain, or an infection or toxic chemical influence...”. The claims on aetiology of autism presented here are yet to be proven further.

2.1.2 Various concepts of autism

While there has been overwhelming research evidence supporting primarily organic causes of autism, this is a condition that has ‘many and varied manifestations’ according to developmental stages and age. Inevitably, professionals with different perspectives have produced different concepts and theories on autism based on these manifestations associated with cognitive, psychological and social problems.

2.1.2.1 Autism as a primarily cognitive disorder

Since the mid 1960s, some psychiatrists and psychologists have given much attention to the linguistic and cognitive deficits in autism (Howlin and Rutter, 1989).

Although linguistic and cognitive deficits have generally been viewed as secondary handicaps associated with autism, DeMyer et al(1973) and Lockyer and Rutter(1967) viewed linguistic and cognitive abnormalities as the main problems of autism, by pointing out the overwhelming evidence in the ‘general delays of intelligence shown by autistic children and their specific pattern of cognitive dysfunction’, such as deficits in skills involving ‘sequencing, abstraction and semantic meaning’(Howlin & Rutter, 1989). Frith (1989) proposed ‘the central coherence theory’ that a fault in central thought processes in the brain resulted to detachment and fragmentation into obsessive meaningless activities often observed in individuals with ASD.

Ricks and Wing (1975) located the central problem of autistic children to their deficit in symbolic function. However, as Trevarthen points out, it is unlikely that autism is due to a linguistic, cognitive, or symbolic deficit since ‘autistic children's intelligence and language ability vary greatly’ (Trevarthen et al, 1996, 1998).

2.1.2.2 Psychological impairments shown in autism

Tinbergen and Tinbergen (1983) located the core problem of autism to ‘the motivational conflict behaviour’ for approach and withdrawal for social contact. They viewed autistic children as dominated by anxiety, which caused social withdrawal and consequent failure to learn social interaction. Agreeing with Tinbergens’ theory, Welch designed ‘Holding Therapy’, claiming that physical holding could facilitate closer contact and attachment between the parents (especially the mother) and the child (Tinbergen and Tinbergen, 1983). Renowned Korean child psychiatrist, Hong (1993), while appreciating Kanner's initial insight on autism as social-affective disorder, viewed the condition primarily as a biologically caused attachment disorder. He identified the role of attachment crucial in the overall infant development, which secured the survival of a baby. Therefore, he began a Mother-Child Attachment Promotion Programme at the day clinic of child and adolescent psychiatry, Seoul National University Hospital in the early 1990's and this programme became a benchmarking programme for many other child psychiatric hospital day clinics for young children with autism in Korea. However, the view that autistic children do not form an attachment to their caregivers seems outdated, since studies showed that the autistic children were emotionally attached to their caregivers even though the way in which they displayed show attachment tended to be idiosyncratic (Aitken and Trevarthen, 1994; Capps, Sigman and Mundy,1994; Rogers and Pennington, 1991; Sigman & Ungerer, 1984).

Hobson(1993, p. 11) emphasized the need to understand “not only what is inherited or acquired in neurophysiological terms, but also what are the essential

psychological impairment or impairments that occur as a result”. Child psychotherapists in autism (Alvarez, 1992; Meltzer et al, 1975; Tustin, 1990, 1992) at the Tavistock Clinic reported in depth case studies of emotional difficulties encountered by individuals with ASD. Improvisational music therapy has also a long record of addressing emotional difficulties within this therapeutic approach, and consequently improving capacity in emotional-regulation with individuals with ASD (Alvin and Warwick, 1991; Kim, 1996; Nordoff and Robbins, 1971a; Robarts, 1996).

2.1.2.3 Affective and relational vs. social cognitive disorder

Since 1985, the debate on autism centered on whether it is primarily an ‘affective-relational’ or ‘social cognitive’ deficit. Baron-Cohen, Leslie and Frith (1985) presented a new cognitive theory, namely ‘the theory of mind’ hypothesis of autism. The main point of this hypothesis is that while typically developing children can attribute mental states (such as belief, desires, intentions) to themselves and others, most autistic children fail to develop the theory of mind (ToM), resulting in ‘the social and communicative abnormalities’ (Baron-Cohen, Tager-Flusberg & Cohen 1993). Baron-Cohen (1991b, 1995) considered that skills in joint attention are the essential pre-cursor to develop ToM. Many joint attention studies are under the social cognition theory that links joint attention behaviour as the developmental milestone for developing language, play, imitation, social interaction, and the ToM (Baron-Cohen, 1991a, 1995; Charman et al., 1997; Mundy, 1995).

In disagreement with ‘ToM’, Trevarthen (Trevarthen et al, 1996) cited Hobson’s study (1984) demonstrating autistic children’s ability to appreciate others’ viewpoints in a visual-spatial setting as well as non-autistic children with matching I.Qs. Trevarthen and his colleagues (1996, p. 53), in agreement with Hobson (1993), criticized the theory of mind as follows;

"The theory of meta-cognition is a manifestly rational one that separates the mind from body and it does not seek evidence on bodily expression of emotion – vocalization, facial expressions, gestures and body movements. Such movements are full of information about self-other awareness".

Hobson views autism as ‘a biological based impairments in social-affective relatedness’ which affects the overall developments of the child, including social, cognitive, imaginative and symbolic function (Hobson, 1993). In simpler words, autism is regarded as ‘a disorder of relating’ (Trevarthen et al, 1996).

2.1.3 Treatment for children with ASD

The rationale of interventions for autism has changed many times over the last 60 years according to the changes in concepts of autism. Major influences and changes in the treatment of children with ASD are presented here.

When the notion of ‘refrigerator mothers’ was widespread in the 50s and 60s in Europe and America, psychotherapy was thought to be the most appropriate treatment for autism, attempting to compensate for supposedly inadequate parenting by the ‘emotionally cold’ mothers (Baron-Cohen & Bolton 1993; Howlin & Rutter, 1989; Tustin, 1992). Although it was a mistaken belief causing guilt and strain on parents, Trevarthen pointed out the importance of this issue for the appropriate intervention to help the child and the parents (Trevarthen et al, 1996). Murray and Trevarthen (1985) observed two month old babies showing somewhat autistic features when their mothers withheld their normal responses (the still face experiment). Trevarthen and his colleagues (1996, p. 80) stressed the need to “help autistic children who may have to be supported and encouraged somewhat like an avoidant infant, with measured, responsive and unintrusive approaches”.

Howlin and Rutter (1989) noted that in the 1950s, some psychiatrists considered autism as a form of ‘childhood schizophrenia’. They also reported that this was the period when physical treatment began to replace psychotherapy in both psychiatric illnesses and autism although this approach was soon to be proven incorrect. Medication, megavitamin therapy, hormone treatment, and specific diet implementation (the gluten and casein free diet) have been tried as part of physical treatment of autism. However, these treatments have not been proven beneficial for all cases of autism (Baron-Cohen & Bolton 1993; Howlin et al, 1987; Trevarthen et al, 1996). Nevertheless, autism researchers in medicine still search for an effective drug since organic factors have been recognized as a foundational cause of autism (Baron-Cohen & Bolton, 1993). Currently medications for autism are often used to treat secondary symptoms of behavioural problems such as aggression, severe temper-tantrum, attention deficit, hyper-activity and self-injurious behaviours, rather than treating the primary disorder (Green, 1991).

From 1970s, treatment and educational approaches began to shift from non-directive methods to highly structured ones. Behavioural and cognitive-behavioural models for teaching autistic children have been used worldwide. Lovaas techniques and TEACCH (Treatment and Education of Autistic and Related Communication-handicapped Children) are well-known behavioural interventions and a highly structured way of teaching children with autism. The controversial practice of Daily

Life Therapy (the Higashi approach) – the Japanese model for educating the children with autism with the emphasis on physical exercise, music and art – is also a highly structured educational model on the whole. There is extensive research evidence indicating highly structured, intensive behavioural intervention both in therapy and education may lead to some successful developmental gains for many children with autism (Kasari, Sigman, Yirmiya & Mundy, 1993; Lovaas, 1987; Mundy & Crowson, 1997), especially in modifying maladaptive behaviours, shaping self-help skills, occupational, educational and linguistic skills and even improving the children's IQ (Baron-Cohen & Bolton, 1993). However, Baron-Cohen and Bolton (1993) criticized the limitation of behavioural approach in that such methods did not bring significant improvement to social, communicative and imaginative abnormalities since these triadic impairments of autism did not solely depend on a single behaviour that can be manipulated. The triad of social impairment (Wing, 1988a), therefore remains largely unchallenged. Individuals with ASD have a strong tendency to systemize their environment and it is not surprising to find out that they appear to do better in a highly structured intervention programme. However, the core issue for their developmental problems is not whether they have specific abilities in language, educational, even intellectual one, but rather their ability to generalize and adapt that many of us are able to do, and take for granted.

The option approach of the son-rise program (see for more information: www.autismtreatmentcenter.org) represents quite a contrasting model (child-centred) to behavioural model. The advocates of the option approach view autism as a relational and interactional disorder with a neurological challenge. Therefore, they primarily promote interaction between the caregivers and the child at the home situation. This program was pioneered by Berry Neil Kaufman (1994) who had a son with autism. This approach provides an environment that is sensitive and responsive to the interests and behavioural patterns of individual child in a non-judgmental and empathic way. This is done by the adult (usually the parent) joining the child's world with strong emphasis on imitation rather than forcing the child to conform to the world around him/ her. Research showed that autistic children made significantly more eye contact and creative toy play when being imitated by their mothers (Dawson and Galpert, 1990). Therefore, Trevarthen and his colleagues (1996) noted that Nadel (1992) considered 'imitation' as 'a bridge to closer cooperation in communication' between the interacting partner and the child with ASD. This may give the child a sense of control of what happens in social interaction and motivate the child to learn through interaction with the caregiver. The

basic principle of the son-rise program has some common aspects when compared to the principles of improvisational music therapy, although in detail there are procedural and methodological differences between the option methods and improvisational music therapy. However, systematic evaluation of option approach has not been carried out yet (Trevarthen et al, 1996, 1998).

Behavioural approaches such as TEACCH, Lovaas and Daily Life Therapy are the adult-led approaches providing a predictable environment with a fixed routines (highly structured ones) to which each child are expected to adapt, whereas less structured option approach is the child-centred approach providing an environment that is sensitive and responsive to the interests and behaviours of the individual child. Trevarthen et al (1996, 1998) pointed out that the likelihood of both approaches producing familiar routines due to ‘the obsessional insistence on sameness’ that is characteristic of autistic children. As music therapists working with children with ASD, we should be aware of what our clients are capable of and what their limitations are to give us clear idea of where the therapy work lies.

As this current study employs both unstructured and structured parts of the session, these two seemingly contrasting approaches (highly structured behavioral model and option approach) in helping the child with ASD has significant implication for the current study. Although the fundamental principle of this study lies in a child-centred approach, in some ways this study incorporates both approaches in a modified way by employing both the child-centred unstructured part and the therapist led structured part (for more details, see treatment manual 10.1), even though the therapists are instructed to work within the child’s focus of attention, interests and tolerant level in both parts in a sensitive and responsive way in order to facilitate the child’s self-motivation for social interaction. Rationales for employing contrasting two parts in this study will be discussed fully in Chapter 3.

Coming back to the aetiology of autism, Trevarthen considered the abnormal development of an infant’s ‘inborn prelinguistic interactive system’ as a crucial cause for autism (Trevarthen et al, 1996). He then hypothesized autism as due to a genetic fault in the core regulators of the embryo, which leads to errors in cerebral cortex and cerebellum. Aitken and Trevarthen (1994) hypothesized that this was why psychological problems manifested some months after birth. Hobson (1989, 1993) and Trevarthen et al (1996) take a similar approach to an understanding of autism; first of all, one has first to understand “normally developing babies and children” and “how they learn the cultural understandings and language”. This comparison of normal and abnormal aspects of

development provides a distinctive view on the disorder and further indicates possible ways of therapeutic intervention. The following section will explore studies of infant developmental psychology, joint attention, and joint attention deficits in autism, and compare the characteristics of normal infant development and its' relevance to music therapy. This has been an area of much interest to music therapists and is widely referred to in the literatures of music therapy (Heal Hugh, 1995; Holck, 2002a, b; Pavlicevic, 1990, 1997; Robarts, 1996; Rogers, 1994; Wigram & Elefant, 2006).

2.2 Shared attention and its normative developmental course in infancy

Since the 1970's, there has been substantial researches on what engages infants – people or things, how they are engaged and how the engagement is developed. As a music therapist working with the children with pervasive developmental disorders, the author has tried to gain deeper understanding on how to work with these children by looking at what normal infants do from the birth till the end of their infancy and how mothers support the development of their babies in that period. This is a field with rich descriptive words like 'mother-infant interaction', 'early non-verbal communication' 'reciprocity' 'primary intersubjectivity'¹ 'secondary intersubjectivity'² (Adamson & Bakeman, 1991; Brazelton, Koslowski, & Main, 1974; Mundy, Kasari, & Sigman, 1992; Trevarthen, 1979). Trevarthen (1979, 2001) has claimed that infants are born with the capacity for intersubjectivity that babies have the inherent ability to relate to and communicate with people. Research has even indicated that the origin of the early mother-infant reciprocal patterns was found even three months before birth following normal full-term birth (Decasper & Carstens, 1981; Trevarthen, 1993b). If that is true, newborns are well equipped to enter into an early human communication. This early human communication is not possible without the ability to share 'attention' with others.

According to Adamson & Bakeman's model (1991) of normative development of shared attention, there are three developmental stages in infancy; from 'shared alertness' to 'interpersonal engagement', and then 'joint involvement' first with objects and then gradually with symbols. They claim that this is a predictable series of

¹ "Mental activity that links the feelings, conscious purposes and thoughts of one person with those of another by means of expressive behaviours of all kinds" (Trevarthen et al, 1998(2nd edition)).

² Trevarthen et al (1998) also defines the stage of development as follows; "when an infant, over nine months of age, is motivated to take interest in the orientations and actions of other persons in such a way as to permit cooperation in object recognition and task performance. The beginning of 'person-person-object' awareness, and an essential step in the development of 'acts of meaning' and language."

transformation that occurs in time. Even though there are some different opinions among researchers on precise timing as to exactly when these transformations occur and how they are defined, the following is more or less widely accepted view.

2.2.1 Shared alertness: From birth to two months

From birth to two months, ‘shared alertness’ is observed between infants and their mothers. Many theorists note a sensitive responsiveness in the infant’s cerebral arousal level to the attention of others (Trevvarthen, 1987; Wolff, 1987). A number of experimental studies showed that even very young infants could differentiate inanimate and animate objects, showing different manners of relating to them (Trevvarthen, 1979; Wolff, 1966). Within hours after birth, newborns are already interested in people, especially the sound and smell of their mother become a great attraction to look for. Neural activation studies indicated abnormalities in auditory cortical processing both in children and adults with ASD when they listened to vocal sound or speech-like sound, whereas they showed a normal response to non-vocal sound (Boddaert et al, 2003; Boddaert et al, 2004; Gervais et al, 2004). These studies clearly showed that individuals with autism failed to activate the brain region, especially superior temporal sulcus (STS) voice-selective regions in response to vocal, or speech like sound. These findings suggest not only abnormal cortical processing of socially relevant auditory information in autism, but also the persistence of it into the adulthood. The implication of these findings is grievous to the overall development of the individuals with autism.

Unlike children with autism, normal babies can even imitate certain expression of others in this period (Trevvarthen, 1987). The question remains how the mothers might facilitate those shared moments with their babies. Adamson and Bakeman (1991) reported maternal holding and verbalization increasingly co-occurred with alertness of the baby even by the end of the first week. Infants’ movements and vocalization also show responsive accommodation to the maternal holding, caresses and mother’s gentle vocalization. Vocalizations of newborns are found to convey complex information about internal feeling states and have remarkable features that could be related to the basic foundation of speech (Trevvarthen, 1979, 1987). Sheinkopf and his colleagues (2000) pointed out vocal atypicalities of preverbal autistic children. They cited the early study of Ricks and Wing (1975) that the non-verbal vocalization of the autistic children was more difficult to identify in terms of context or function than that of the children in control group. A study even found that mothers of autistic children had a difficult time in recognizing the affective context of their children’s vocalization (Arnold et al, 1993). Considering the fact that even newborns can convey distinctive affective qualities in

their vocalization, this seems to be important feature clinicians should pay attention to when they are working with the children with autism. Communication between two people needs two motivated participants. When we consider the abnormal auditory processing and vocal atypicality in autism, it is not surprising to find language and social impairment in individuals with autism. It is also not difficult to understand diagnostic confusion and emotional and behavioural difficulties the condition entails. Looking back to normal development, mothers' utterances in responding to their newborns are said to produce the prosody and temporal regularity that can be easily assimilated by the infants for further communication (Newson, 1979; Trevarthen, 1979, 1987). Wolff (1987) reported that the time spent in mutual attentiveness between the infants and their mothers increased more than double within three months after the birth. Caregivers also seem to organize newborns' activities in ways to provide opportunities for shared attention through expectable part of care-giving. For example, through feeding, the mothers may provide the earliest instance of turn taking and of mutual contingency. This seems to be done within 'the limits of the infant's organization' through routine day-to-day care-giving (Adamson & Bakeman, 1991). Working within 'the limits of the autistic child's organization', providing predictable musical structure, but also encouraging the child's motivation to take part in reciprocal musical interaction has been the way most music therapists work too.

2.2.2 Interpersonal engagement: two to six months

From two to six months after birth, 'interpersonal engagement (primary intersubjectivity)' is the most noted change from the period of 'shared alertness'. Infants in this period engage solely in dyadic interaction participating in a finely tuned exchange of affects with their mother (Bakeman & Adamson, 1984; Brazelton, Koslowski, & Main, 1974; Stern, 1974; Trevarthen, 1979). Wolff (1966) considered the ability to achieve eye contact as one of the two-month-olds' most striking social achievements. Abnormality in intersubjectivity and visual attention has long been noted as key factors of social deficit of autism, especially in young children (Joseph & Tager-Flusberg 1997; Trepagnier, Sebrechts, & Peterson, 2002).

Normal infants in this period control their gaze toward and away from their caregivers; cycle of looking and no looking, attention and no attention. Brazelton and his colleagues (1974), and Stern (1974) claimed that the regulation of gaze provided young infants a means to modulate the effect of external stimulation on their internal state. The mother's role of sensitively tuning in with the infant's cycles of attention seems to be crucial here. Brazelton and his colleagues (1974) stated; "the most

important rule for maintaining an interaction seemed to be that a mother develop a sensitivity to her infant's capacity for attention and his need for withdrawal....” This rule seems to correspond to the clinical application of music therapy with wide range of client groups, especially to children with ASD.

Stern (1974, 1985) pointed out that the mother constantly altered her behaviour, using the infant's visual attention and state as cues for change in her behaviour. The early non-verbal communication is termed as ‘proto-conversation (Bateson, 1975)’ and ‘pre-music and pre-speech dialogue (Trevarthen, 1979)’. Trevarthen (1987) described specific features in mother's speech in that period. Mothers use one-to-three short syllable utterances, with a breathy voice and clear intonation using a falling–rising prosody to invite their baby into mutual interaction. While engaged, they share a same beat and temporal structure. In fact, mother-infant interaction is mutually influential in nature - both engaging and tuning into each other's feeling states using various vocal exchanges, eye contact, facial expressions and bodily movements (Kaye, 1979; Trevarthen et al, 1996). Among these empathic and reciprocal exchanges, both Stern (1985) and Trevarthen (1979) recognized musical features like melodic contour, tonal intensity, rhythmic patterning and dynamics as crucial early models of emotional and social communication. Moreover, Trevarthen (1987, 1993b) found that after three months of age, most mothers begin to use nursery songs, enhancing playfulness with the baby in their interaction. Those songs are usually made up of simple verses with regular changes in pitches and rhythms. Mothers vary the musical expression of songs accordingly to the state of their baby challenging the interest and anticipation of their baby. This variation in expression is how music therapists usually work with young and developmentally delayed children. Through the musical form of early dyadic interaction, infants recognize their own feelings as well as their mothers as something sharable and understandable by each other. Infants' knowledge of the world, language development, sense of self and others all depend on this sharing communication and on the emotional regulation of this sharing. Many music therapists recognize this musical improvisational nature of the early mother-infant interaction as significant and considers as relevant facts and models for their clinical work (Brown, 1994; Heal Hughes, 1995; Holck, 2002a, b; Pavlicevic, 1990, 1997; Robarts, 1996; Rogers, 1994; Wigram & Elefant, 2006).

2.2.3 Object engagement and mothers' elaboration of the object play: from six month onward

In the middle of the first year, the infants begin to turn away from dyadic

interaction towards things around them. Now typically developing 6 month-old infants tend to devote their attention to the non-social objects around them. This is the period what Bakeman and Adamson (1984) called ‘object engagement’. Studies (Adamson and Bakeman, 1985, 1991; Kasari et al, 1990; Trevarthen and Hubley, 1978) confirm that without the initiative of the mothers, infants do not readily share with their mothers their involvement with objects until the near the end of their first year. This does not mean that infants do not want to share their involvement with objects with their mothers, but rather it is a period when infants do not have the capacity to freely attend to both the object of their interest and to the person next to them. It is the mothers, who follow their infants’ attention to a toy by supporting and elaborating the toy play, which marks the beginning of the triadic interaction (person-person-object), in other words, joint object engagement (Adamson & Bakeman, 1991). Joint object engagement is how joint attention is manifested in behaviors (Kasari et al, 1990).

2.2.4 Joint object engagement marking the emergence of secondary intersubjectivity

Trevarthen and Hubley (1978) consider the ability to coordinate attention involving oneself with a partner and an object as ‘an important developmental milestone’ marking the emergence of ‘secondary intersubjectivity’. Approximately during the nine to twelve month period, infants display increasing proficiency in joint attention skills with their caregivers. Typically developing infants in this stage display alternating gaze back and forth between the caregivers and the object of mutual interest. This behaviour is found particularly impaired in autistic children (Siller & Sigman, 2002; Trepagnier et al, 2002). The process of dyadic interaction toward triadic interaction may be slowly evolving continuous process whereby attention and affective exchange are rigorously elaborated, negotiated and regulated between the infants and the caregivers (Mundy et al, 1992).

Adamson and Bakeman’s (1985) experimental study shows that affective display becomes gradually briefer by 15~18 months. Although episodes of joint attention behaviour still offer more chances to share affective experiences between partners than any other occasions, affect exchange is not the top priority for older infants anymore. For the older infants, the object world becomes the topic of their interaction and an affective signal becomes ‘a mean to comment’ on the topic. This implies ‘emotional referencing’ that is essentially lacking in children with autism. There is an interesting finding concerning affect expression of infants that at younger age, no

single element of affect expression such as vocal, facial, motoric expression stands out as a dominating feature. However, as the infants grew older (by the end of infancy), over 75% of affect expression contained a vocal element, and only less than 10 % was motoric. Contrary to the author's own expectation, they found that at no age was facial expression the exclusive or dominant mode (Adamson & Bakeman, 1985). As previously mentioned, vocal atypicalities have long been noted in children with autism and it would be interesting to find out whether the experience of mutual music making process in improvisational music therapy has any impact on the children's expressive quality of vocalization and emotional sharing.

There are studies indicating that infants demonstrate significant individual differences on measures of joint attention development (Carpenter, Nagell, & Tomasello, 1998; Mundy & Gomes, 1998). Some studies indicated that the difference in joint attention development may be related to 'caregiver affective disturbance' (Goldsmith & Rogoff, 1997), 'disorganized attachment status' (Claussen et al, 2002), 'age and maturity of caregivers' (Flanagan et al, 1994), 'impoverished caregiving in institutions' (Kroupina et al, 2002), and 'the general level of social stimulus in the home environment' (Wachs & Chen, 1986).

The ability to integrate attention between an object of one's interest and a partner does not consolidate until 15 months of age and the caregiver's role to 'scaffold' such development has been proven to be crucial as studies shown above. It should also be noted that mothers often use ritualized games such as peek-a-boo to engage their infant during that period. Those highly organized and 'routinised formats for the structuring of interpersonal transactions' is one of the effective ways of maintaining joint object engagement with infants (Bruner, 1983; Hobson, 1993). Hobson (1993, p. 37) stated that the core structure of such format consisted of 'anticipation' that "the response of each member was dependent upon a prior response of the other, so that there are demarcated roles that may eventually become reversible". The implication of these studies is significant to the therapists who work with children with ASD.

Vaughan and her colleagues (2003) pointed out that the individual differences of skills in joint attention may derive from three different factors:

- 1) The infant's temperament, especially emotional reactivity and responsivity (Adamson & McArthur, 1995; Trevarthen & Aitken, 2001)
- 2) The brain maturation of systems involved in social cognition and social information processing (Mundy et al, 2000)
- 3) The caregivers' sensitivity and capacity to support joint attention in interaction with infants (Adamson & Bakeman, 1985; Tomasello & Farr, 1986).

Many studies confirmed that the ability for joint attention in infancy significantly correlated with later language development (Baldwin, 1995; Dunham, Dunham, & Curwin, 1993; Tomasello, 1988, 1995; Tomasello & Farrar, 1986) and language development is related to social competence in childhood (Mundy & Sigman, 2006). Therefore, Mundy and Sigman (2006) claimed that infant joint attention skills that predict individual differences in social competencies in typically developing children also do so in “at risk and developmentally disordered children”. After reviewing the longitudinal research on the development of infant joint attention skills and the levels of social competencies in children, Mundy and Sigman (2006) divided existing theories into four models of joint attention development; (1) the caregiver scaffolding model (e.g., Bakeman & Adamson, 1984, as presented in this chapter), (2) the social-cognitive model (e.g., Baron-Cohen, 1995, as presented in this chapter), (3) the social motivational model (e.g., Hobson, 1993; Trevarthen & Aitken, 2001, as presented in this chapter) and (4) the neurodevelopmental model (e.g., Dawson et al, 2002; Mundy et al, 2000, also as presented in this chapter). All these studies indicated that the development of joint attention skills at an early age is the foundation for social interaction, social learning and social cognition.

2.3 Definition of joint attention

The terminology of attention and joint attention has been defined in many ways in different studies with various subcategories in order to refine the meaning in particular context (Adamson and McArthur, 1995; Bruner, 1995; Filley, 2002). As described extensively above, Adamson and Bakeman (1991) have defined attention with ‘the qualities of alertness, involvement, engagement that occur during the social events’. They have chosen the word ‘shared’ instead of ‘joint’ or ‘mutual’ meaning ‘the infant’s attention to periods when they are acting in concert with responsive partner’. Their description pertains to those qualities of improvisational music therapy, which is suitable for this research.

The terminology of joint attention is often used interchangeably with mutual attention, shared attention, or coordinated attention. Bruner (1995) simply describes joint attention as ‘a state or an episode where one shares attention with others’. In infant developmental psychology, the narrow definition of joint attention is ‘looking where someone else is looking’ – known as joint visual attention (Butterworth, 1991; Corkum

& Moor, 1995; Sigman & Kasari, 1995). As explained earlier, studies confirm that from about six months onward, infants begin to lose interest in direct eye-contact interaction with their mothers, and often look at things around them. Typically developing infants from six months till two years old, gradually use joint visual attention more and more by moving their attention from a toy to the mother and back to the toy (Kasari et al, 1990). This joint visual attention could occur when an infant is playing with something, showing or pointing something to the mother, or has accomplished some task, or is faced with an ambiguous situation. Many studies on joint attention behaviours of both normal infants and children with autism have focused on measuring joint visual attention (Butterworth, 1991; Corkum & Moore, 1995; Kasari et al, 1990; Mundy, 1995; Mundy & Crowson, 1997; Mundy et al, 1990; Siller & Sigman, 2002).

There is still a controversy concerning abnormality in joint visual attention in autism. An earlier study has suggested that autistic children avoid eye contact with others (Richer & Coss, 1976). Mundy and his colleagues (1986) in their experimental study showed that autistic children specifically lacked the ability to alternate their gaze between a person's face to an object for establishing shared attention. Other studies indicated that autistic children looked at their social partners' face no less than their comparison group (Hermilin and O'Connor, 1970; Kasari et al, 1990). Joseph & Tager-Flusberg's study (1997), however showed that autistic children attended to their mother's face only half as much as comparison group.

Although there is a high degree of correspondence between eye contact and an engagement state, the author strongly feels that joint visual attention alone may not provide adequate evidence of joint engagement state between the child and the therapist in music therapy situation where most salient interaction is happening through auditory engagement. For the purposes of this study a definition was required that could adequately describe this specific type of engagement found in music therapy situations. Bruner (1995) defines joint attention at its most sophisticated level as "meeting of minds" that is not only a shared or joint focus of attention, but also on shared context and presuppositions. "Meeting of minds" is a meta-cognitive level that is not only difficult to prove, but also most autistic children may have a great difficulty to reach that level at all. In fact, when working with individuals with ASD, one should be careful to avoid any assumptions about shared meanings.

Bakeman and Adamson (1984) used a term 'coordinated attention' between objects and people describing 'an interactive state of the mother-infant dyad' meaning that they shared a common focus of attention. Moreover, Bakeman and Adamson

provided two different state of joint engagement with an object play; passive joint engagement: the infant does not show any awareness of the partner's involvement, although often it is the partner's action on the object that draws the infant's attention to it. coordinated joint engagement: the infant actively coordinates attention to both the partner and the object (conventional joint visual attention). Passive joint engagement seems to describe the early clinical situation with the autistic children in music therapy. This means that both partners are actively involved in the same object, but the child shows little awareness of the other's involvement, or even the presence. Bakeman and Adamson (1984) differentiate passive joint engagement from object engagement where the infant plays with his/her toy alone. Bakeman and Adamson state that passive joint engagement is "qualitatively different from the coordinated joint engagement, however, is more similar to it than solitary object engagement". Both 'onlooking' (a period when the child looks at a toy or things around him) and 'object play' are likely antecedent for passive joint engagement.

As explained earlier, infants do not have sufficient ability to coordinate their attention between a person and an object at the beginning of the object play around 6 months of age, then what mothers do is that they manipulate objects (shaking rattles, rolling balls etc) in ways to capture the baby's attention by making the object "come alive" (Adamson & Bakeman, 1985; Bakeman & Adamson, 1984). So the baby's attention appears to be mostly on that object while the mother complements this object engagement. A mother's elaboration of toys in passive joint engagement is actually less demanding of the infant's attention than in coordinated joint engagement. It seems necessary for mothers to elaborate the toy play before the infants' ability for joint attention is fully developed. In music therapy, this could explain the state of the child with little awareness of the therapist when both the therapist and the child are actively involved in mutual music making process. This could even happen with two different instruments. For example the child is beating the drum, and the therapist accompanying him on the piano. In the beginning of the drum playing, the child does not pay attention to the therapist, but becomes gradually excited to play the drum as the therapist's accompaniment with the piano gives a sense of coherent and dynamic structure to his drum playing. This often leads to spontaneous glancing at the therapist's face as his awareness of joint engagement grows. There may be a possible transition from passive joint engagement in the music making process toward coordinated joint engagement.

Tomasello and Farrar (1986) offer a similar definition that the mother and the child share joint attentional focus while in joint play with an object. More recently Adamson and McArthur (1995) refer to "opening or maintaining a communicative

channel with the partner.”

In this study, a working definition of joint attention behaviour was formulated, based on the above literature.

Working definition of joint attention behaviour: *Joint attention behaviour is a three-way exchange that involves the child (self), and another (the therapist), and objects either in musical form (instrumental or vocal joint engagement), or in play. This may, or may not be expressed in visual focusing between people and objects, but will display the interactive state of joint engagement either passive, or coordinated (Adopted from Bakeman and Adamson, 1984 & Kasari et al,1990).*

2.4 Joint attention deficit in autism

Bruner (1995, p.11) states that “without a ready ability for joint attention, human beings fall into a grievous state of pathology”. Research findings suggest that a disturbance in the development of joint attention skills is an important characteristic of social deficit in young autistic children (Bruner, 1995; Mundy et al, 1986; Mundy, Sigman and Kasari, 1994). In the next section, the distinction between skills in attention and joint attention is made and joint attention deficit in autism will be fully discussed.

2.4.1 Attention in autism

Filley (2002) states that attention requires complex neurobehavioural coordination, which is the foundation for all higher functions such as communication and social interaction (Mundy, 2003; Posner & Rothbart, 1994, 1998). The possibility of attention dysfunction as core deficit in autism has been implicated for many years – such as deficits in arousal modulation (either hyper or hypo level of arousal), orienting, filtering (inability to filter out irrelevant stimuli), gazing (specifically the abnormality in eye-to-face gaze) and over-selectivity (intense focus on details and failure to interpret multiple cues in the environment). However, these claims are not clearly supported by experimental researches, nor abandoned entirely since there is no consistent data to support those claims (Goldstein, Johnson, & Minshew, 2001). There were a few studies indicating that disturbance in sensory modulation may be due to a malfunction of ‘the reticular core of the diencephalons and brainstem’, which may also result in disturbances in attention and perception of children with ASD (Dawson and Lewy, 1989a; Ornitz, 1983). In the clinical situation, the author has encountered (on numerous

occasions) children with ASD (especially young children with severe form of autism and severe mental retardation) displaying various levels of attention deficit, sensory defensiveness and disturbance in arousal modulation, etc. It seems to the author that maybe young children with severe form of autism are more likely to suffer from a specific region of brain malfunction that primarily deals with the neurobehavioural coordination of attention process. However, since these symptoms did not appear in all children with ASD in a coherent way, the author keeps an open-mind as this area needs to be thoroughly investigated.

Other studies confirm that ASD children did not differ in their non-social attention ability from a mental age matched group of non-autistic children, but show their spontaneous attention shift mainly toward non-social stimuli (Maestro et al, 2002; Trepagnier, Sebrechts & Peterson, 2002).

This finding is frequently observed in the characteristics of the behaviour in children with ASD both in specific circumstances (therapy and educational settings), or in everyday life. The child with autism may become preoccupied with certain activities, paying great attention for a long time to interests such as spinning a cymbal on its stand in a music therapy session. Disturbance in social attention in children with ASD seems to be related to abnormal auditory processing reported earlier in 2.2.1, and this type of behaviour is also observed in music therapy. The children may turn immediately to the direction where the sound of certain instrument is coming from, but do not readily respond when their name is called out. Studies on auditory abnormalities in autism showed that individuals with autism were generally found to have impaired perception towards linguistic and social auditory stimuli whereas their auditory perception of pitch and music were found to be better than normal control groups (Boddaert et al, 2004; Gervais et al, 2004; Kellerman, Fan & Gorman, 2005). Consequently, impaired global processing and enhanced local processing of the brain have been suggested by some researchers and such findings seem to correlate to impaired language and social skills in individuals with ASD. Abnormal response to socially demanding sound and immediate response to non-social and musical sound stimuli are something music therapists need to be increasingly aware of when working with autistic children. The children's heightened perception to music can work as an advantage in music therapy interventions compared to other interventions.

2.4.2 Evolutionary perspective in shared attention

Bruner (1995, p.12) states; “the need to share the objects of our attention with others” is specific to human nature. He quotes the primatologists Chance and Jolly

(1970) that the more dominant simian gets more attention from other members of the group, but they do not share attention with others. He states that those simians have very little free attention to share if an immediate extrinsic response is not required. Mutual eye gaze is often perceived as a threat in many non-human primates, triggering either an attack, or agonistic behaviour. Baron-Cohen (1995, p.47) quotes Chance (1967) that “struggles for dominance are often only ended with one animal averting its gaze”. He explains that this is to reduce the physiological arousal produced by direct gaze.

Viewing autism from an evolutionary psychology perspective, Baron-Cohen (1995) describes two neurocognitive mechanisms that have evolved to function for adaptive purposes. Eye Direction Detector (EDD) is the rapid detection of the eyes of another organism for identifying if one is the target of another organism’s attention. Shared Attention Mechanisms (SAM) is for establishing a shared focus of attention with another organism. He explains that EED is achieved by building dyadic representations that specify whether the eyes of another organism are directed toward oneself, or not. This can both function to “detect threat” if there is a predator, or to detect whether one is the target for “prosocial reasons” such as grooming, greeting, and mating.

Tomasello (1995) points out that “attention is inherently intentional and so joint attention is also”. Tomasello (1995) emphasizes that the development and understanding of other persons as intentional agents play an important role in the development of social cognition. Tomasello and his colleagues argue that non-human primates and some children with autism understand the basics of intentional action. Some studies (Carpenter et al, 2001; Tomasello et al, 2005) also indicate that intention detector (ID) appear to be intact in children with autism, as well as in the great apes. What makes children with autism different from us is that they do not take a part in activities involving shared intentions and attention. Tomasello and his colleagues (2005, p.675) describe how shared intentionality develops gradually during the first 14 months of life following two ontogenetic pathways: “(1) the general ape line of understanding others as animate, goal-directed, and intentional agents; and (2) a species-unique motivation to share emotions, experience, and activities with other persons”.

Baron-Cohen (1995) explains that ‘Shared Attention Mechanisms (SAM)’ requires the capacity to build ‘triadic representation’. In principle, SAM can be constructed in a number of different modalities (visual, auditory, tactile). However, using visual modality is far easier than other modalities, therefore SAM uses EDD frequently. He argues that SAM is essential for joint attention, and also for the

development of a ‘theory of mind’ in children. He states that EDD is a very old (even reptiles, birds and primates have EDD) mechanism, whereas SAM appears only recently in evolution and is best observed in humans. He states that SAM is, however, almost in all cases impaired in children with ASD. A question remains as to whether these authors are suggesting that children with ASD are less evolved neighbors of our species.

2.4.3 Disturbance in joint attention and affective reciprocity in infancy and early childhood autism

Studies show that infants are born with the strong tendency and eagerness to share their attention and feelings with others (Jaffe et al, 2001; Mundy, Card, & Fox, 2000; Stern, 1985; Trevarthen, 1979, 1987, 1993b, 2001). A study based on a recent retrospective parental report revealed that infants with autism had marked limitation in both person-to-person (primary intersubjectivity) and person-person-object social engagement (joint attention episode marking secondary intersubjectivity) (Wimpory et al, 2000). McArthur and Adamson (1996) compared preverbal autistic children with children with developmental language disorder (DLD). Children with ASD were not only less likely to be engaged in joint attention episode, but also monitored the channel of communication with the adults 37% less often than the children with DLD. Dawson et al (1998) undertook a study comparing children with autism with developmentally matched children with Down's syndrome and with normal children to examine their ability to visually orient to two social stimuli (name called, hands clapping) and two non-social stimuli (rattle, musical jack-in-the-box), and in terms of their ability to share attention (following another's gaze or point). The results found that, compared to children with Down's syndrome or typical development, children with autism more frequently failed to orient to all stimuli, and that the failure was much more extreme for social stimuli. The authors concluded that children with autism who oriented to social stimuli took longer to do so compared with the other two groups of children. They also reported that children with autism also exhibited impairments in shared attention. Moreover, for both children with autism and Down's syndrome, correlational analyses revealed a closely linked relationship between shared attention performance and the ability to orient to social stimuli, but no relation between shared attention performance and the ability to orient to non-social stimuli. Consequently, their results suggest that social orienting impairments may contribute to difficulties in shared attention found in autism.

While sharing, following, and then directing others' attention and behaviour are

the developmental sequence of early social interaction among typically developing infants (autistic children shows a different pattern of development than normally developing children), difficulties in joint attention and affect sharing are found to be stable deficits in children with autism (Carpenter, Pennington, & Rogers, 2002; Kasari et al, 1990, 1993). Psychological assessment on sharing attention and affects is often used as a diagnostic indicator for autism among infants (Charman et al, 1997; Maestro et al, 2002).

Autistic children do not readily appear to share positive affects (smiles and laughter) with others during an interpersonal situation as much as their mental age matched non-autistic children, but rather display high frequencies of unshared laughter in a strange or inexplicable situation (Joseph & Tager-Flusberg, 1997; Kasari et al, 1990; Reddy, Williams & Vaughan, 2002). Wigram (2002) reported frequent occasions where emotional synchronicity occurred spontaneously during the mutual music making process between the therapist and the child in improvisational music therapy. Considering that music is an essentially emotive medium and the mutual music making between the therapist and the child is often a playful process, it is likely to see clear evidence of emotional synchronicity developed in time during the course of music therapy process. Again, considering the clinical implication of that development, it would be clinically relevant to find out whether emotional synchronicity occurs and increases during the musical joint engagement between the child and the therapist within a session and across sessions.

2.4.4 Individual differences in joint attention skills in children with autism

Bruner (1995) has stated that the disturbance of joint attention skills is a specific characteristic of young children with ASD that has both theoretical and clinical significance. There are studies showing that individual differences in early non-verbal communication skills in infants, such as the capacity to follow a gaze (Response to Joint Attention; RJA), can have significant impact on early development of joint attention episodes between the child and caregiver, and subsequently on language development (Baldwin, 1995; Dunham, Dunham, & Curwin 1993; Siller & Sigman, 2002; Tomasello, 1988, 1995; Tomasello & Farrar, 1986). There are also studies suggesting individual differences in joint attention skills in children with ASD.

Some studies suggest that the levels of joint attention disturbance in children with ASD may vary as well. This implies the developmental delays in the emergence of joint attention skills in children with ASD, not the absolute impairment (Leekam &

Moore, 2001; Mundy, Sigman & Kasari, 1994; Paparella, 2000).

Mundy, Sigman and Kasari's 1994 study examined the effects of mental age and IQ on the joint attention skills of children with autism, mental retardation, and normal development. The results of this study showed that even though children with ASD displayed fewer joint attention behaviours than did the control groups in all areas of early non-verbal communication measurement when measured with the Early Social Communication Scales (ESCS), (for more information, see Chapter 4.6.2) including joint attention skills, the higher mental age and IQ group displayed more joint attention behaviors than did the low mental age and IQ group with ASD. Consequently, there were marked differences between low mental age and high mental age groups shown in joint attention skills. The children with higher IQ and higher mental age did not exhibit clear deficits on lower level eye contact behaviour, while lower mental age and IQ group displayed significant deficits in lower level of eye contact joint attention skills. However, even the higher mental age and IQ group displayed clear deficits in high levels of initiation of joint attention (IJA) skills (pointing and showing) than two control groups (mental retardation and normal group). The high mental age and IQ group with autism displayed fewer responses to joint attention (RJA) bids than the normal control group, but not so significant differences were shown when compared with the mental retardation group. However, the low mental age and IQ group were almost completely non responding to RJA. The results of the Social Interaction Measure of ESCS were similar here. However, the measure of behavioural requests (BR) of ESCS showed little difference between the children with mental retardation and children with ASD, but more differences was shown when compared with a normal control group. BR serves as an instrumental function such as when a child requests assistance from another person to obtain an object that is out of reach. It is an imperative form often observed in children with ASD anyway, therefore, it is not surprising to find that there is no marked disturbance in BR skills in children with ASD.

They suggested that differences in IQ and mental age may be related to differences in the type of joint attention skill deficits displayed by children with ASD.

There are many studies both in normal infancy and autism stating that joint attention skills are closely related to later development of language acquisition (Bruner, 1977, 1995; Mundy, Sigman & Kasari, 1990; Siller & Sigman, 2002; Tomasello, 1995; Tomasello & Farrar, 1986). Better joint attention skills (both initiation and response of joint attention) are associated with better receptive and expressive abilities (Mundy & Sigman, 2006; Mundy et al., 1986; Mundy Sigman, & Kasari, 1990; Sigman & Ungerer, 1984) and later language development (Mundy et al, 1990, 1992; Sigman & Ruskin,

1999; Siller & Sigman, 2002). Some studies (Bono, Daley & Sigman, 2004; Mundy and Gomes, 1998; Mundy & Sigman, 2006) specifically indicated that the children who responded more positively to the joint attention bids of others (RJA) made the largest developmental gains in language. Bruner (1995, p.11) quoted Clark (1992) stating there were four requirements that speech communication imposed on us;

- “1) we have a common ground of background knowledge
- 2) an awareness of collaborative processes involved in interacting
- 3) a sense of how to design our messages for our audiences’ understanding
- 4) a willingness and ability to coordinate and negotiate meanings”.

Bruner (1995) clearly stated that without the ‘raw’ joint attention capacity, none of these requirements can be fully met. In the current study reported in this thesis, the range of the children’s ability varies greatly, from low functioning pre-verbal to high-functioning verbal children who can speak in sentences. It will be interesting to first find out whether music therapy intervention increases skills in joint attention, and at what level, and then whether there is a sign of receptive and expressive use of language development in children with ASD according to an individual’s level.

The findings of studies described above, seem to have an important implication for early identification and intervention for children with autism. With young low functioning children with ASD, eye contact measure may be useful, while with high functioning autistic children, higher level of joint attention measures such as pointing and showing would seem to be more useful as an assessment of their skills in joint attention.

The studies reviewed above have reached a common conclusion that joint attention disturbance in some young children may be sensitive to early intervention effects and we can improve the joint attention skills in children with ASD (Bono, Daley, & Sigman, 2004; Drew et al, 2002; Kasari et al, 1993; Mundy & Crowson, 1997; Siller & Sigman, 2002). As joint attention deficits can clearly be seen as a fundamental aspect of a social disturbance in young autistic children, and then understanding the effects and the process of early intervention will be crucial for the future development in the treatment domain.

2.5 Research on understanding emotions among children with ASD

Children with autism are known to have a limited and/or impaired understanding of mental states such as emotions and the behaviours of others, namely

the theory of mind (ToM) deficit. Rieffe, Meerum Terwogt, and Stockman (2000) examined whether children with high functioning autism (HFA) (mean age nine years three months) compared with typically developing children of six and ten year-old, could recognize typical and atypical emotions in emotion-evoking stories. The children were presented with stories and were asked to give an explanation of the protagonists' typical and atypical emotions. In the case of typical emotions, children with HFA gave fewer mental state explanations than even normal six year-olds, whereas in the case of atypical emotions, autistic children performed as well as the 10 year-old controls. The authors argued from the result that the children with high functioning autism have the capacity to understand other people's mind, maybe less capacity than normal children, but not necessarily defective.

As mentioned earlier in 2.4.1, some studies suggested that children with ASD have better perception of pitch and music than typically developing children. As music is fundamentally rich in emotional context, the following study will be much interest to the music therapists working with autistic people. Heaton, Hermelin & Pring (1999) looked at whether children with ASD show impairments in processing affective information in the area of music. In this study, 14 children with autism and Asperger syndrome compared with 14 controls matched by age and intelligence were tested for their ability to identify the affective connotations of melodies in the major or minor musical mode. They were required to match musical fragments with schematic representations of happy and sad faces. The results found that the groups did not differ in their ability to ascribe the musical examples to the two affective categories, and the authors concluded that in contrast to their performance within social and interpersonal domains, children with autistic disorders showed no deficits in processing affect in musical stimuli.

The implications of those studies may provide us some theoretical basis of potentials that improvisational music therapy has for children with ASD. Music may be used to facilitate the children to be more expressive and to externalize their own emotions, as well as to recognize emotional contents of the music in both receptive as well as interactive ways. This may lead to greater capacity for self-expression and emotional sharing with another human being. When there is a sharing of emotion, there is also sharing of attention. Could the inherent emotional communicative power of music motivate children with ASD to be involved in triadic interaction (person-person-object) as has been suggested in the literature described in this chapter? Chapter 3 will describe relevant case studies and research findings in music therapy and discuss the important aspects of improvisational music therapy and the role of the therapist.

CHAPTER 3

MUSIC THERAPY WITH CHILDREN

WITH AUTISTIC SPECTRUM DISORDER

Bruscia (1998, p.20) defined music therapy as “a systematic process of intervention wherein the therapist helps the client to promote health, using musical experiences and the relationships that develop through them as dynamic forces of change”. While this current doctoral study focuses on improvisational music therapy with the children with ASD, there are different types of music used by non-music therapists, or different types of music therapy interventions for children with autism. Gold, Wigram and Elefant (2006) stated that the fundamental techniques of music therapy include improvisation, songs and listening to music. As the children with ASD have marked impairments in communication, social, behavioural and language skills compared to their peer group of typically developing children, the primary and common features of most interventions including music therapy, are in social and communicative components. In principle, music therapy uses music and its elements to facilitate people to express their feelings, communicate and interact with others. Gold, Wigram and Elefant (2006) claim that music therapy addresses some of the core problems of people with ASD in this way. In this chapter, the role of the music in non music therapy types of intervention, and the more specific approach of music therapy and improvisational music therapy will be described and discussed in details. Research and case studies reporting the treatment of ASD with music therapy will be reviewed.

3.1 Research on sound and music used for therapeutic purposes

There are different types of methods on the usage of music to shape and alter some of the behaviours of the children with ASD and those methods that were reported to have some successful outcome are introduced here. There are studies where music is used as a part of behavioural modification approach for autistic individuals. Schmidt et al (1976) reported a study involving the behavioural analysis of a 10-year-old child and 27-year-old autistic male adult. They received alternating individual and group sessions

under two conditions (condition A, one-to-one reinforcement and shaping, and condition B, differential reinforcement). Music served as an effective curriculum (to teach appropriate musical responses) and as a context to shape and alter other individual and social behaviours. The result showed increases in appropriate behaviours and decreases in inappropriate behaviours.

Miller and Toca (1979) reported the use of Melodic Intonation Therapy (MIT) with a three-year-old, nonverbal autistic boy, who was treated for a year with a Simultaneous Communication method involving signed and verbal language, in order to develop a useful communication system. As this method was proven not useful in this case, an adaptation of Melodic Intonation Therapy (singing plus an intoned verbalizations) was applied, which generalized to other situations.

Auditory Integration Therapy (AIT) was developed as a technique to improve abnormal sound sensitivity and communication skills in individuals with behavioural disorders including autism. A controlled study (Mudford et al 2000) on AIT was carried out with 16 children with autism in a crossover experimental design. Dependent measures were taken by raters blind to the treatment order, included parent and teacher ratings of behavior, direct observational recordings, IQ, language, and social/adaptive tests. This study found significant differences in the control condition that was superior on parent-rated measures of hyperactivity and on direct observational measures of ear-occlusion. However no differences were detected on teacher-rated measures. The authors reported no increase in subjects' IQs and language comprehension, but decrease in adaptive/ social behaviour scores and expressive language quotients. There was no clinical or educational benefit identified from the treatment. In 1998, the American Academy of Paediatrics Committee on Children with Disabilities reviewed AIT and concluded that currently available information did not support the claims of the treatment as efficacious for improving communication skills in individuals with autism.

More recently in 2004, a systematic review for the Cochrane Collaboration on AIT and other sound therapies similar to AIT such as the Tomatis Method and Samonas Sound Therapy with children with ASD was undertaken (Sinha et al, 2004). The reviewers found no trials assessing sound therapies other than AIT. Six Randomized Control Trials (RCTs) of AIT, including one cross-over trial, were identified with a total of 171 individuals aged three to thirty nine year-old. In this review, meta-analysis was not possible due to very high heterogeneity and presentation of data in unusable forms. Three studies did not show benefits of AIT over control conditions and the remaining

trials reported improvements of some kind at 3 months for the AIT group. There were no reported adverse effects of AIT. The reviewers (2004) concluded that more research is needed to inform parents', carergivers' and practitioners' decision making about the value of AIT for individuals with ASD.

AIT is currently available in Korea as well and many of the author's clients with ASD had been referred and treated with AIT. AIT in Korea usually promises definite short term treatment (three to five months only) with promising outcomes (improving sound sensitivity and communication skills), and the parents are keen to try potentially beneficial therapeutic approaches. Similarly a few years ago, acupuncture was reported as having some successful impact on the children with ASD in Korea by a national broadcast company. After hearing the news, many parents signed up for acupuncture in Korean Traditional Medicine. Anecdotal reports suggest it is quite difficult for children with ASD to cope with acupuncture as a treatment.

3.2 Research on musical aptitude of autistic children

Earlier in Chapter 2, neurophysiological studies were reviewed showing that autistic children's perception of pitch and music was found to be not impaired, but actually better than a normal control group. Music therapy researchers have also undertaken similar studies with like areas of measurement

Thaut (1988) analysed improvised tone sequences of autistic children, comparing them with musical improvisations by normal and mentally retarded children. He analyzed and scored for rhythm, restriction, complexity, rule adherence, and originality of improvised music of these three different groups of children. He found those autistic children's tone patterns, almost reached the scores of normal children. Thaut also investigated perceptual preferences of autistic children comparing responses to auditory musical and visual stimuli (Thaut 1987). The results showed a weak preference of autistic children for the auditory musical stimulus. However, the autistic children spent significantly more time with the musical stimulus than the two control groups of children.

3.3 Research on musical interaction and playing

Two studies undertaken by non-music therapists showed the benefits of music

for the development of communication, social interaction and other functions for children with ASD.

Shore and Stephen (2002) explained that music had many benefits for a pupil with ASD. Their study suggested that playing a musical instrument not only gives a chance to engage in social interaction and communication, but also strengthens self-esteem as children participate in activities through which they can potentially excel.

Wimpory, Chadwick and Nash (1995) examined the effects of Musical Interaction Therapy (MIT) on the social and symbolic development of an autistic child. This was a single case design with a 36 months-old non-verbal subject. The treatment consisted of a musician synchronizing live music to mother-child games such as swinging, patting, blowing, stroking, vocalizing, action-rhymes, and singing. The authors concluded that MIT fostered interpersonal contact and joint attention by facilitating playful joint action. A follow up study at two years confirmed that these positive changes were sustained, and generalized beyond the therapy.

3.4 Music therapy research: controlled studies

There are many case studies and clinical reports suggesting that music therapy is effective in improving skills in social interaction, and communication of the children with ASD. However Robarts (1996, p 138) wrote; “the claim that music therapy can help individuals with autism still rests mainly on the profession’s own substantial and rigorous clinical documentation and on the recognition of its benefits by parents, carers and other professionals”. There have not been many controlled studies, especially in improvisational music therapy. There are, however, a number of controlled studies using highly structured, behavioural approaches by North American Music Therapists.

Hairston (1990) undertook a comparison study of music therapy vs. art therapy and evaluated the responses of four autistic and four non-autistic children with severe to profound learning disability. The Developmental Therapy Objectives Rating Form was used to rate the subjects on four areas of development: behaviour, communication, socialization, and pre-academics. The Systematic-Who-to-Whom-Analysis Notation was used to obtain behavioural ratings in five categories: work, non-understandable verbalization/inappropriate work, contact received, observing the teacher, and play. The findings revealed few significant differences in measures of behaviour and development between autistic and non-autistic subjects. Predictably during the experimental period,

non-autistic subjects made greater gains than autistic subjects in the four developmental areas.

In the most recent Cochrane review of music therapy for autistic spectrum disorder, Gold, Wigram, and Elefant (2006) selected three small controlled researches (Brownell, 2002; Buday 1995; Farmer, 2003) examining the short-term effect of brief music therapy interventions based on behavioural modification techniques for children with ASD. In all three studies, compared to a “placebo” condition, music therapy was found to be more effective either in improving maladaptive behaviours, or skills in verbal and gestural communication.

Brownell (2002) investigated the effects of a musically adapted version of social stories on the behaviours of four elementary pupils with autism for the purpose of modifying the children’s maladaptive behaviours. Individualized social stories were created to address a current behavioural goal, and original music was composed to accompany each story. There were three conditions as independent variables; no intervention (A), reading the story (B), singing the story (C). The results of the study demonstrated reading the story and singing the story were significantly ($p < .05$) more effective at reducing the maladaptive behaviours of the children than a no intervention condition, and singing the story was a little more effective than the story only condition, but did not reach a statistically significant level.

Farmer (2003) compared music vs. no music conditions with ten young autistic children age two to five determine whether those conditions have any impact on the spontaneous verbal and non-verbal communication. Farmer used active and receptive music techniques (guitar playing and song) for music condition. The children were randomly assigned into two groups (music vs. no music) and results demonstrated an increase in verbal response for the music group while verbal responses of the control group were inconsistent.

Buday (1995) examined the use of music as a method to promote better memory for manual signs with children with autism. Buday was interested in the specific role of music, especially in terms of its stimulating and motivating effects. She attributed language delays in children as due to environmental deprivation caused by lack of appropriate stimulation. Therefore she used music as reinforcer and incorporated music and sign stimuli pairing in this study. The goal was to teach 10 children 14 signs under two conditions. Condition A involved signs taught with music and speech while condition B involved signs with rhythm and speech. Results indicated more correct imitation in signed words and spoken words in the music condition rather than in the

rhythm condition training. The author speculated the potential of using music to promote pragmatic skills effectively in children with autism.

Two studies (Brownell, 2002; Farmer, 2003) were based on each authors Master's thesis, and the remaining study (Buday, 1995) appeared to be carried out by a psychologist. Therefore, none of the studies were carried out by experienced music therapists. The lack of involvement in the research area by experienced clinicians in the field is not a new finding, however, the author is in agreement with Wigram (1995, 2002), who strongly advocated the impending pressure and needs for 'evidence based practice' in music therapy in many countries in order to develop the profession and maintain the sustaining and potential growth in the employment of music therapists. The more involvement of experienced clinicians in music therapy research in autism area, the better results may come out since the clinician's knowledge and skills will undoubtedly contribute to the results of the clinical trial.

After reviewing these three studies, Gold, Wigram and Elefant (2006) concluded that even though the results were showing positive effects on the communicative skills of children with ASD, the studies had limited clinical applicability for the reasons below;

“In all studies, music therapy was provided on a daily basis in an individual setting. The duration of the music therapy condition was only one week in all studies. All studies used a highly structured approach to music therapy, which is not unexpected given the American Origin of the studies. All studies used receptive techniques (listening to music); one study also used active techniques” (Gold, Wigram & Elefant, 2006, p.6).

These three studies used mainly receptive music in a highly structured setting, therefore, the findings are more applicable to the music therapists who are working in that way, but not to the music therapists who are working in an improvisational approach. Gold, Wigram and Elefant (2006) also pointed out that the method of such studies (time-limited, intensive treatments) will be relevant to the acute care and also where treatment resources are limited. However, as they pointed out, ASD is a perplexing developmental disorder that requires comprehensive and long-lasting intervention. Therefore, a well-designed treatment study reflecting how an improvisational music therapy session is carried out in a real world that involves randomization and valid and reliable outcome measures is needed. This will be elaborated more in the conclusion section of this chapter.

3.5 Improvisational music therapy: clinical practice and research

Basic principles and rationales of improvisational music therapy will be described and some of the research findings will be introduced in this section together with the need for well-designed intervention study in this area, leading to the particular design of this doctoral study.

Robarts (1996, p.135) writes; “improvisational music therapy (Bruscia, 1987, 1989, 1991), in which the therapist encourages spontaneous musical expression, is a mainstream clinical orientation, basic to many of the training courses, and it is a form of music therapy widely used in the treatment of autistic children.” As mentioned before, even though there have not been many controlled studies in improvisational music therapy, over the years there have been more researches (both qualitative and quantitative) carried out in this field by the experienced clinicians (Bunt, 1994; Edgerton, 1994; Holck, 2002a; Müller & Warwick, 1993; Oldfield, 2003; Saperston 1973).

In an early case study, Saperston (1973) reported the use of music in establishing communication with an autistic child with severe developmental disability. Initial improvisation by the therapist elicited very little response, until Saperston began to modulate his musical improvisation to the child’s physical behaviour, in the first instance, walking around the room. Thereafter, Saperston reported adapting his improvised musical response to various movements of the child, including walking, stamping, rocking, shuffling and hand pounding, with resulting increased awareness and attention from the subject as to what he was doing. After 20 sessions, the child had learnt how to influence the improvised music to stop or change dynamically in response to his own behaviour, and over 18 months of therapy, the case study reported increased eye contact, pleasure, and generalization of engagement with others outside the music therapy sessions. The significance of Saperston’s changing his approach to being musically responsive to the child’s behaviour is highly relevant to the current study.

Cindy Edgerton’s study (1994) was on ‘the effect of improvisational music therapy on the communicative behaviors of autistic children’. She had 11 autistic children (six to nine years old) in improvisational music therapy for 10 weeks. She developed the Checklist of Communicative Responses / Acts Score Sheet (CRASS) in order to measure the subject’s musical and non-musical communicative behaviours. Results demonstrated the efficacy of improvisational music therapy in increasing the subject’s communicative behaviours.

Müller & Warwick (1993) were the first clinicians who dealt with ‘maternal involvement’ in music therapy research with ASD children. The results indicated increases in turn-taking and musical activities, as well as decreases in stereotypic behaviour in children. Although Warwick (1995) described a detailed account of one mother gradually taking over the role of the therapist using musical-relational techniques observed in music therapy sessions, the results revealed the mother’s participation did not appear to have noticeable influence on children’s behaviour.

Holck, Oldfield and Plahl (2004) had ‘a video micro analysis in music therapy research workshop’ based on their own doctoral research involving in-depth microanalysis of improvisational music therapy with children with severe functional limitations, including autism. These microanalytic techniques appear to be largely influenced by the early pioneers of improvisational music therapy (Nordoff & Robbins, 1971a, 1977) and infant developmental researchers (Brazelton et al, 1974; Stern, 1985; Trevarthen, 1979) since improvisational music therapy and early human interaction share a lot of common grounds.

Holck (2002a) conducted such a qualitative research using microanalytic techniques in her doctoral study with children with severe communication difficulties, including autism. As she carried out a detailed video analysis of musical and gestural interaction between the child and the therapist, which included auditory (music, voice, sound) and visual (movement, gestures and facial expression) data, her detailed transcription of ‘commusical¹’ interplay in music therapy between the child and the therapist presented the child’s facial expression showing joy, spontaneous eye contact, and the initiatives of the child together with the well-timed responses of the therapist to the child’s holistic expressions. She presented a number of detailed therapeutic methods on how improvisational interaction can begin with either musical or non-musical motifs from the child’s expressions and how a joint history of musical interaction can be built and developed. She pointed out that departure from the expected ritual of commusical interplay can bring humour, surprise, teasing, frustration and aversion depending on the child’s level of development in social interaction and tolerance. She also emphasized the importance of ‘challenging’ the child’s need for rigid conformity since the therapist knew when and how to return to the well-known interaction themes for the child. This is a very valid and clinically important strategy when working with children with ASD.

Bunt (1994) described The Hackney project where he carried out a clinically

¹ ‘Commusical’ interplay was defined “as forms of interaction in music therapy, that are analogues to early (preverbal) communication forms, but correspond to the child’s chronological age and are inherently musical” (Holck, 2002a).

controlled study with two groups of eight non-verbal children with profound and multiple learning difficulties. He used a cross-over, repeated measures design based on the three conditions of music therapy, no music therapy and individual play with toys, and as in this study, he treated the data statistically. The results found the music therapy intervention to be more effective than the play session in promoting increased visual attention towards the therapist; increased vocalization; decrease in interruptive behaviour; increase in initiation of activity; increase in imitation; significant development in turn-taking activity. He also found that the children played longer with the toys, and with a longer attention span than with the musical instruments. However, the children looked at the therapist longer in music therapy and there was also more looking away (gaze avoidance) behaviour in the music therapy session than the play session. This was an interesting finding that will be discussed further in discussion section together with the findings of the current study.

Holck (2004b) and Wigram & Elefant (2006) stated that Plahl (2000) also reported the evidence of increased visual attention together with increased turn-taking activities with children with severe communication difficulties in music therapy. However as her study was written in German, the author was only able to obtain this information through the texts of these authors mentioned above and also informally.

The non-verbal characteristics of musical interaction, especially in musical improvisation, are often compared to the core aspects of early human interaction offering “verbal people to access pre-verbal experiences” and “non-verbal people to interact communicatively without words”, and “all to engage on a more emotional, relationship-oriented level ” (Alvin and Warwick, 1991; Gold, Wigram and Elefant, 2006). This, the author considers, is the fundamental aspect of improvisational music therapy.

3.5.1 A rationale for the use of improvisational music therapy for children with ASD

The musical and improvisational nature of early dyadic interaction between the mother – infant has been recognized as significant and relevant facts and models for clinical work by many music therapists in improvisational music therapy, especially with children with severe communication difficulties, including autism (Brown, 1994; Gold, Wigram & Elefant, 2006; Heal Hughes, 1995; Holck, 2004b; Pavlicevic, 1990, 1997; Robarts, 1993, 1996; Rogers, 1994). Gold, Wigram and Elefant (2006) described how we are born ready to engage with the ‘communicative musicality’ of conversation with others. They point out that active music making in improvisational music therapy

is not only an effective medium to engage individuals with ASD in non-verbal social exchange, but also offers premises for communicative behaviours, such as joint attention, eye contact, and turn-taking to occur. This will be the focus of extended argument in the discussion section in Chapter 7.

3.5.2 The role of the therapist

Following the rationale of adapting infant development theory into clinical practice of improvisational music therapy, there seems to be high degree of correspondence between mother-infant communication and the process of improvisational musical interaction in music therapy.

First, mother-infant interaction is a highly musical area where mothers seem to offer finely tuned, sensitive and responsive assistance to their babies' developmental needs. Music therapists also consider engaging the child at their level by sensitively 'tuning in' to the state of the child as a significant feature of their clinical practice. Meeting the child at their level individually (the sensitive, responsive and communicative therapist augmenting the child's ability to participate in communication and social interaction) is now recognized as one key factor for successful early intervention in autism (Bono, Daley, & Sigman, 2004; Siller & Sigman, 2002; Trevarthen et al, 1996, 1998). As children with ASD have various levels of abilities in different developmental areas and different characters, one child may not resemble that of another same-aged child. That is to say that each child with ASD has a unique profile of strengths and weaknesses. Therefore, music therapy intervention should also be shaped and chosen on an individual basis and there the strength of improvisational music therapy as an intervention for individuals with ASD lies in the personalization of the approach.

Second, both mothers and the music therapists provide themes, temporal structures, variations, repetitions, patterns and rituals that could form a shared understanding and history with their communicative partner. Holck emphasizes the importance of building 'an interaction themes' between the therapist and the child, which contains 'the child's and music therapist's joint interaction history' (2002a, 2004a). She continues to point out that motivating the child to be engaged in musical communication requires creating an interaction form that is both 'meaningful and enjoyable' for both partners. She states that music therapy can provide such framework that 'from no interaction to a kind of mutuality' can develop. Based on her doctoral

study involving video micro-analyses with this population (Holck, 2002a), she locates ‘the gradually developed short repeated musical forms or motifs’ as the key factor to develop meaningful interaction with the children with ASD. In her case study, it is often the child who initiates short motifs whether it is musical, or behavioural (for example, a short rhythmic motif on the drum, or jumping on the trampoline), followed by the therapist using ‘matching’² technique (such as complementary rhythm playing, or matching piano playing) that initially built up the interaction theme. Wigram (2004) expresses the importance of ‘matching’ as a clinical technique in improvisational music therapy that it is not only the most valuable, but also the typical starting point to work with the client, from which different strategies, or methods emerge. When we consider the children’s difficulties in participating (both initiating and responding) in social interaction and communication, such improvisation framework seems to offer an unique opportunity for the child to lead the interaction and to have the sense of control as well as to develop the sense of mutuality on their own terms. Holck also reports that movement, gesture, or facial expression is not only present, but these are also ‘just as fundamental to the interaction as the musical figure’. In improvisational music therapy literature, as Holck herself expressed in her paper, there are a lot of such examples (Alvin and Warwick, 1991; Brown, 1994; Bunt, 1994; Holck, 2002a, 2004a; Howat, 1995; Nordoff & Robbins, 1977; Robarts, 1996; Wigram, 2002; Oldfield, 1995, 2003). Holck (2004b) considers the child’s ability to participate in ‘turn-taking’ activity in particular, as an important indicator of ‘the child’s contribution to the continuation of the social interplay’. She concludes that joint interaction history in mutual music making enables mutual and shared expectation to develop within the interaction, therefore it facilitates not only mutual understanding of each other’s action as meaningful, but also ‘the chain of interaction going’.

Third, both the mother and the therapist are constantly altering their action according to their partner’s response in an improvisatory way in order to obtain intersynchrony and reciprocal harmony. Robarts (1996, p. 140) writes; “it is this very intersynchrony, flexibility and creative reciprocity that is absent in the autistic child, and which the music therapist seeks to help the child experience and assimilate to whatever extent she or he is able to do so.”

² Wigram defines ‘matching’ as follows; “improvising music that is compatible, matches or fits in with the client’s style of playing while maintaining the same tempo, dynamic, texture, quality and complexity of other musical elements” (Wigram 1999a, 2004).

Neuroendocrine Studies show that sensitive, responsive and attentive parenting modifies stress physiology of young children (Gunnar, Brodersen & Nachmias, 1996; Gunnar & Donzella, 2002). In fact, as explained extensively earlier, both mother-infant, and therapist-child interaction is mutually influential – tuning-in, elaborating, extending each other's expressions. British object relations theory has emphasized the role of the mother and the therapist as the modulator of the child's emotion and behaviour (Alvarez, 1992; Bion, 1962, Meltzer et al, 1975). Meltzer's term, in particular, of '2nd ego function' of the therapist to the child with weak ego, holding and containing what cannot be digested, nor contained by the child himself, seems to correspond to this physiological evidence above. This highlights the process of containment and transformation. There is an even more interesting experimental study indicating the co-occurring of the physiological attunement (neuroendocrine study) in normal mother and child relationship when the mother behaves in a sensitive and attentive way (Sethre-Hofstad, Stansbury & Rice, 2002). Perhaps, it would be worthwhile to see whether musical attunement of the therapist also modifies the child's stress physiology (especially the child who displays high level of anxiety, distress, and maladaptive behaviour), and induces some kind of physiological attunement between the therapist and the child in a future study if possible.

Mismatching, or dissynchrony, on the other hand, is also a developmentally important phenomenon to consider. Adamson and Bakeman (1985, 1991) noted that from three to nine months of infancy, the degree of coordination increased. However, mismatching still occurred frequently. In fact, it is humanly impossible to maintain perfectly harmonious and finely tuned interactive state all the time. Winnicott (1971) introduced, therefore, a concept of 'good enough mothering' – meaning that mothers allowed their baby 'the brief moment of omnipotence' through well-matched experiences, but also there were moments of frustration caused by mismatching. As long as the proportion of frustration does not exceed the child's capacity to tolerate and digest, frustration is also a necessary element for further development and psychological maturation for the child. The crucial question is that how mothers and the therapist repair mismatches and dissynchrony that occur unavoidably. Murray and Trevarthen (1985) did artificial mismatching experiment with two-month-old babies. This is called a 'still face mother trial'. After seeing their mothers' still face, infants actively modulate their gaze patterns, affect display, and then show signs of distress or even autism like avoidant behaviours. From the result of this experiment, the authors speculated that even a brief experience of the distorted person engagement could be cumulative and that

infants tended to display less than optimal affect and attention even after their temporary still face mothers resumed their normal activity. Trevarthen and his colleagues (1996) stated that the clinicians and teachers, who work with the child with autism, may need to encourage the child like the way mothers trying to encourage the two month-old avoidant infants.

3.5.3 Clinical issues informing rationales for session design

In clinical terms, mismatching can be a failure to match by the therapist, but can be also done for a therapeutic purpose with well-judged clinical intuition or plan. When we are working with the children with ASD, at some point in the course of therapy work, it is necessary to work with their difficulties with changes (Brown, 1994; Wigram, 2002). Both in music therapy and in mother-infant interaction, there seems to be time for matching and time for challenging the child. Alvarez (1992) talked about the need for the therapist to become ‘live company’ to the child. She emphasized the need for the therapist to be gently active, occasionally to chase the child a little and claim the child’s attention. The challenge for children with ASD in improvisational music therapy can be the introduction of a new instrument, a new way of playing, or simply the therapist taking control of musical interaction.

The crucial question is divided into two parts; 1) how do we know the right timing for matching and for challenging when working with the autistic children. In other words, when is the right time to allow the child to lead the musical interaction and for the therapist to introduce certain direction and structure; 2) when the therapist introduces a new direction with a certain structure, how could this be done in the best possible way in order to minimize the predictable resistance, anxiety, or even the fear reaction of the child.

This is directly linked to the idea of creating the treatment protocol in this study. Improvisational music therapy has a long history of promoting non-judgmental and empathic ways of emotional communication and relationship between the child and the therapist (Alvin & Warwick, 1991; Nordoff & Robbins, 1971a, 1977; Priestley, 1975, 1994). Ever since the famous saying ‘meeting the child where he/she is’ was pronounced by Nordoff and Robbins (1977), it has been followed by many music therapists in improvisational music therapy. Like the basic principle of the son-rise program of option institute in the USA, improvisational music therapy encourages the therapist to join the child’s world through a mutual music making process rather than to direct the child to do something in order to make the child conform to the world around him/her. This could mostly be done by the therapist paying undivided attention towards

the whole being of the child such as what the child does and does not do, his interests, focus of attention, body posture and movement in the session, and responding accordingly in the here-and-now. This study incorporated this basic principle in the treatment protocol. It is about allowing the child an opportunity where he/she can take an initiative and lead the interaction within the musical form.

On the one hand, unstructured approaches can be helpful to work in an empathic way, and to build up a good ‘commusical interplay’ and ‘joint interaction history’ as described by Holck (2002a, 2004a) between the child and the therapist in order to maintain and develop the musical interaction that may be crucial for further development of skills in joint attention and social interaction. On the other hand, a structured approach can work developmentally with the child’s pathology, to bring a new experience and expand the experience within the child’s capacity for flexibility.

3.5.4 Controversy over improvisational music therapy

As many experimental researches indicated that highly structured, intensive behavioural intervention both in therapy and education may lead to successful developmental gains for the children with ASD (Mundy & Crowson, 1997; Lovaas, 1987; Kasari, Sigman & Yirmiya, 1993), improvisational music therapy has long been challenged and criticized for a seeming lack of structure. It is partly true in a sense that music therapists who use improvisation as a main therapeutic medium, do not always plan ahead, nor structure the session in a detailed, planned and unchangeable way when they work with children with ASD. However, it does not mean that they do not know what therapeutic direction they like to pursue. It simply means that they do not pre-determine precisely what specific instruments and music they will use, and in what way, until they engage the child and watch the child’s moment-by-moment reaction. Having said that, music therapists also pay close attention to preferred instruments and musical material from the child’s perspective, ensuring that some consistency occurs in the sessions to build a working relationship on a firm and stable foundation. It is also untrue to say music therapy lacks structure since music itself has inherent form and structure that may lead to successful therapeutic outcome with the autistic child. Wigram (1995, 2002) has pointed out that it is the matter of “what degree and nature of structure” that is considered essential and desirable to the children. There is a significant body of clinical documentation showing how either structured or more freely creative techniques in improvisational music therapy can engender the children’s motivation for communication and social interaction. Robarts (1996) stated that some of the most substantial clinical documentations were those of Alvin and Warwick (1991), Warwick

(1995) and Nordoff and Robbins (1971a, 1977).

Brown (1994) compares the co-existence of stability (structure) and change (spontaneity) in our daily life with those qualities in music. Autistic children's often compulsive needs and tendency to adhere to rigid patterns could be found in their musical expression in music therapy as well and these are often the very issue music therapists have to deal with vigorously when working with the children with autism. While the structure of music may give a sense of safety and predictability, the flexibility of music, especially when music is improvised, is ideal for working through issues of control and rigidity. Therefore, improvisational musical interaction can foster flexibility and creativity in a structured framework for those children who cannot readily adjust themselves to the surprises of daily life. Wigram (1995) has noted that music therapy offers the child opportunities to be "more in control, and even musically direct the behaviour of adult", therefore, focusing on what the child is able to do rather than focusing on the pathology of the child.

Earlier in Chapter 2 and 3, the principles of improvisational music therapy were compared with early mother-infant interaction in detail. Recently there are more and more experimental studies that may support the principles of improvisational music therapy as a valid and effective treatment.

3.5.5 Experimental studies supporting the principles of improvisational music therapy

A longitudinal study shows that the children of the caregivers who showed higher levels of synchronization during play interaction with their child, developed superior joint attention and language over a period than the children of caregivers who showed lower levels of synchronization (Siller & Sigman, 2002). In other studies, improvement of social communication skills in autistic children was reported when the behaviour of the adult remains contingent on the behaviour of the child (Hwang & Hughes, 2000; Lewy & Dawson, 1992; Watson, 1998). One experimental study shows that adult's imitative behaviour of the child's behaviour was proven to be effective in promoting a proximal social behaviour such as touching, while contingent behaviour of an adult was effective in promoting a distal social behaviour such as attention (Escalona et al, 2002).

Siller & Sigman's study (2002) point out the contrast between how parents of normally developing children usually behave (this has been explained extensively

earlier), and how parents of autistic children tend to behave and how they are often advised to behave. Parents of children with autism are appeared to be more controlling and directive (Arbelle et al, 1994; Kasari et al, 1988; Watson, 1998). This may be the result of the child's level of disability that parents are trying to compensate by becoming more directive and controlling. Moreover, parent-training programs in autism often instruct parents to structure their interactions so that they have the preconception of what the child should do and how to do it (Lovaas, 1987; Howlin et al, 1987). However, there is little evidence that those approaches are effective in enhancing social responsiveness and language development of the children. Children with autism have been known to display less compliant behaviour such as gaze avoidance and negative affect patterns when confronted with interpersonal demands (Arbelle et al, 1994).

These experimental studies seem to provide the evidence that corresponds with the early mother-infant interaction model; parental sensitivity to the attention of their autistic child is linked to gains of joint attention skills, communication abilities, and language development. The result of Siller & Sigman's longitudinal study is striking in detail; a) Parents' initiation for joint attention was positively correlated with the child's initiation for joint attention when parents synchronized joint engagement with the object of the child's focus of attention, and then the child's initiation for joint attention increased. This clearly shows the child's ability to learn from modeling as long as the activity is selected from the child's focus of attention. B) The child's language development was strongly associated with the parents' quality of verbal input. Parent's utterance that is synchronized to the focus of the child's attention and undemanding in quality was strongly related to the future language gains of the child with autism.

Recently Wigram and Elefant (2006) pointed out the "use of controlled musical attunement" as the underpinning therapeutic method of the therapist in improvisational music therapy. This implies musical attunement that is, moment-by-moment, sensitive use of responsive and improvised music to the child's being. The child's outward expression, initiation and focus of attention can be matched and reflected in the therapist's music. Therefore, it is inherently child-initiated and child-centered therapy. The child, then, somehow senses that the therapist's music has something to do with him. Responsive music made in relation to the child often encourages the child to respond, and even to initiate the interaction in music therapy. This process highlights the 'projective identification' phenomena (Bion, 1962; Schore, 2001) where spontaneous introjection and projection occur between the two parties in music therapy (Kim, 1996).

Early human reciprocal interaction informs the way in which music therapists

structure improvisational music therapy with autistic children. Earlier in Chapter 2.2.1, neurological disturbance has been indicated as the primary cause of social impairments in children with ASD. The lack of motivation to participate in the reciprocal and temporal communication with others is one aspect of social impairment, and this is precisely what we, the therapists should try to help the child to experience and assimilate through the mutual music interaction in music therapy. Trevarthen (2001, 2002) emphasizes the child's need for systematic intervention facilitating cooperative, moment-to-moment motivational and interpersonal responses. "Controlled musical attunement" plays a central role in facilitating spontaneous sharing of affect, attention, and emotional communication between the therapist and the child. What is then, "controlled musical attunement" the music therapist uses in the session?

3.5.6. Musical attunement in comparison to affect attunement

In this study, the term of musical attunement is originally adapted from Stern's "affect attunement" (Stern, 1985); the mother attunes to her baby's expression sympathetically by reflecting and elaborating her baby's expression, and thus reaches and maintains 'interactivity (the sharing of affective states)'. Stern (1985, p.138) considered 'interactivity' as "the most pervasive and clinically germane feature of intersubjective relatedness".

Stern distinguishes 'affect attunement' from mere imitation of the mother's behaviour to the infant. During the first six to nine months from birth, the mother usually starts a chain of interaction with her baby by imitating what she sees her baby do, and stays largely within the same modality (i.e., the mother responds to her baby's vocalization with her own voice, or baby's facial expression is met by the mother's facial expression, etc). From approximately nine months onwards (when the baby begins to show a raw capacity for joint attention), the mother begins to interact with the infant through a kind of matching in a more complex cross modal way. In Stern's theory, this cross-modality is the essential part of 'affect attunement'. While the mother's imitative action towards her baby reflects the overt behaviour of the baby, the cross modality of the mother's 'affect attunement' reflects the baby's feeling states behind that overt behaviour. The theory of attunement originally comes from the psychoanalytic concept (Mahler et al, 1975) that the mother's attunement of her infant's feeling state is crucial for the baby's development of a 'sense of self', and the knowledge of his/her own affectivity. Stern (1985) reported that there were three core components of attunement; intensity (absolute intensity/intensity contour), timing (temporal beat/rhythm/duration), and shape. It will be clinically relevant to find out what the core

components of musical attunement are in this study.

Many music therapists have also recognized the core concept and musical/cross modal features of ‘affect attunement’ as significant features within clinical improvisation between the therapist and the client in improvisational music therapy either explicitly (Pavlicevic, 1990, 1997; Trolldalen, 1997, 2005), or implicitly (Alvin & Warwick, 1992; Holck, 2004a; Robarts, 1996; Saperston, 1973; Wigram & Elefant, 2006). There has been an accumulation of music therapy literature providing ‘therapeutic methods’ in establishing ‘musical attunement’. Wigram (2004) provided the most comprehensive and extensive therapeutic methods relevant to establishing musical attunement, in which different methods and definitions will be elaborated in Chapter 7. Robarts (1996) described her sessions with Colin (a three and a half year old autistic boy), where she used ‘matching’ techniques to meet and enhance Colin’s vocalization, movements, and gestures. Specifically Trolldalen (2005), who presented an entire paper on “the role of affect attunement in musical improvisation” recognized that ‘affect attunement’ occurred largely through a form of ‘matching’, while Wimpory, Chadwick and Nash (1995) used the term ‘musical synchronicity’. Pavlicevic (1997) described therapeutic methods such as ‘matching’, ‘mirroring’ and ‘reflecting’ with detailed clinical and musical examples.

As music therapy is a field with rich descriptive words, the author recognizes the common intention and meaning among different authors using different words, therefore, will not attempt to define these terms in this chapter. Pavlicevic (1997) claimed that clinical improvisation that is jointly created between the client and the therapist is essentially an ‘interpersonal event’ that reveals personal and interpersonal aspects rather than just musical qualities. Jointly created clinical improvisation between the client and the therapist is often reported to have full of ‘vitality affects’ and also often has the description of ‘inter-affectivity’ (Howat, 1995; Pavlicevic, 1990, 1997; Saperston, 1973; Trolldalen, 1997, 2005; Wigram, 2002). Again it will be clinically meaningful to find out whether ‘musical attunement’ enhances ‘inter-affectivity’ between the child and the therapist in this study.

Although the author adapted certain aspects of ‘affect attunement’ such as the mother’s sympathetic responses to the baby’s expression, in creating the concept of ‘musical attunement’ for this study, the ‘cross modality’ of affect attunement is not the exclusive quality of the therapist’s ‘musical attunement’ in relation to the autistic child. In fact, the author does not expect a certain type of modality to be the key feature in

working with autistic children for the reasons below:

The author would like to point out the certain pathological features shown in the development of autistic children. Although some music therapists did not make clear distinction between early form of interpersonal engagement (person-person) and joint engagement (person-object-person) (Bunt, 1994; Robarts, 1996, 1998; Pavlicevic, 1990, 1997), in strict terms joint improvisation involving instruments (the objects), or playing events, the child and the therapist, is the episode of joint engagement marking the secondary intersubjectivity. Studies indicated that disturbance is found not only in the secondary intersubjectivity, but also in primary intersubjectivity in children with ASD (McArthur & Adamson, 1996; Wimpory et al, 2000). This means that young children with ASD may not even have sufficient 'imitation' experience within a single modality with their mothers in the first place, not to mention the lack of opportunity to interact with their mothers within a cross modality (they may have difficulty in recognizing the very effort of their mother's attuning behaviour). One can easily assume the tremendous difficulties the children face in reaching and maintaining the 'interactivity' with another human being. In fact, studies showed that autistic children did not readily share positive affects (smiles and laughter) when interacting with others, but rather display high frequencies of unshared laughter in strange, or inexplicable situations (Kasari et al, 1990; Joseph & Tager-Flusberg, 1997; Reddy, Williams & Vaughan, 2002). Moreover, the developmental sequence of early social interaction (sharing, following and then directing other's attention and behaviour) is also found to be disturbed in children with ASD.

Then, how can improvisational music therapy help children with ASD? As autistic children's perception of music is found to be intact and somewhat superior to normal control group of children (as reported in chapter 2.4.1), creating music in relation to the child's self expression (musical and non-musical) and focus of attention may have a huge potential in drawing the child's attention towards joint musical engagement in music therapy.

The process of music therapy, however, may not escape the developmental deviation shown in children with autism and each child may still respond differently from the other towards the attuning quality of the therapist's music. Some autistic children do not readily respond to a single modal interaction due to their difficulties in sharing the objects of their interest, or in interpersonal engagement. Some even display great difficulty in allowing the therapist to play any instrument at all (the case of Sam introduced in Chapter 1). For some children, the simple vocal imitation of the therapist

towards the child's vocalization (single modal interaction) works well in forming the early reciprocal interaction in music therapy. Many autistic children tend to show some kind of obsessive ritualistic traits in musical interaction with the therapist as well. Some may only allow the therapist to play exactly the same way to their own play with the same instrument leaving no room for flexibility and creativity (single modal interaction). In some cases, even very low-functioning autistic children (as well as high-functioning children) respond to the cross-modality of the therapist's matching music towards what they are doing either immediately, or in time (Holck, 2004a; Saperston, 1973; Robarts, 1996, 1998; Wimpory, Chadwick, & Nash, 1995). Why individual difference exists, the author cannot answer yet.

The developmental path of these children (not all, but for some) in music therapy may also differ from what was characteristic in normal infancy even though a strict comparison is not possible. For the children who either are extremely territorial in their choice of objects, or do not show any interest to instrument, an early music therapy session may start with cross modal interaction with the therapist, and then gradually move towards the uni modal interaction (i.e., being able to share an instrument with the therapist in a turn-taking form). That is, the author considers, a very positive progress, not a regression.

What the past clinical experience taught the author is that the accumulation of 'mutual music making experience'³ between the child and the therapist in music therapy (joint attention episode) can lead to person-person engagement that can be generalized to other situations.

Therefore, the author proposes the concept of 'musical attunement' in the current study as encompassing both single and cross modality. The process of attunement is often intuitive in nature both in the mothers and the therapists. However, the therapist's 'attuned response' is often well-measured responses with a clear understanding of the child's pathology and idiosyncrasies with social-communicative goals in mind. The therapist's 'musical attunement' may be expressed through a single modality, or cross modality according to the clinical judgment of the therapist on the child's developmental state and needs.

Overall, by employing the term "musical attunement", the author is trying to

³ In the current study, 'mutual music making experience' does not always mean that the child does something musically. The child may play, or sing, but also simply move around in relation to the therapist's improvisation. Therefore, showing some awareness of the other person's existence in relation to oneself in music, and consciously or unconsciously participates in the flow of musical moves.

capture the essence of the therapist's sympathetic reflection and elaboration of the child's non-verbal, musical, and non-musical expression in music therapy, but in a broader way. Therefore, musical attunement, as described in this doctoral study of children with ASD, is defined within a wider perspective. It is the finely tuned, sensitive, responsive and the attentive use of the music towards the developmental needs and state of the child with ASD. Like the way mothers gradually alter their way of interacting with their baby according to the developmental stages and needs of their child, it includes not only musical matching and synchronicity to the child's moment by moment expression, but may also include purposeful introduction of 'transition', especially when the child displays obsessive-ritualistic behaviours in joint improvisation, and possibly other therapeutic methods that suits the developmental needs of each child. At some time during the course of music therapy, this may involve mismatching and challenging where it is developmentally necessary according to the clinical judgment of the therapist. The author considers the foundation of these methods is 'matching', and that without 'matching', one can not introduce 'transition', nor challenge the child in the first place. Wigram (2004, p.83) also regarded "matching as one of the most valuable of all the improvisational methods...from which a number of other therapeutic strategies or methods emerge". The disturbance in 'social timing mechanisms (Newson, 1987)' in children with ASD may be helped through this kind of 'controlled musical attunement' enhancing 'interpersonal responses' in children with ASD.

3.6 A clinically centred research study

As this doctoral study aims at assessing the efficacy of improvisational music therapy on the skills in joint attention of children with ASD, a well-designed treatment study is needed as pointed out by Gold, Wigram and Elefant (2006). Recently Connie Kasari (2002) examined early intervention programs for children with autism. Results of her study demonstrated that even though there are many comprehensive treatment programmes reporting successful outcomes in this area, there is not yet evidence of a well-established treatment for autism. It was due to the lack of evidence in four distinctive areas that are essential to a well-designed treatment study; 1) the lack of treatment / comparison groups, 2) the lack of random assignment to treatment groups and replicability of treatment, 3) mostly a small sample size that makes difficult to generalize the findings, and the lack of clear examination of the characteristics of the children in research, 4) assessment measure problems such as inconsistent measures

used in one study (e.g., various measures were used and few studies used similar batteries to assess children at pre and post assessment periods that makes interpretation difficult).

Kasari (2002) indicated clearly that a good intervention outcome study must have at least these elements below:

- 1) a well-designed comparative study involving randomization (possibly matching procedures in some studies) to judge whether one treatment approach is superior to another.
- 2) evaluation of the active ingredients of the treatment programme, such as documentation of the treatment procedure, the use of a clearly instructed treatment manual, fidelity check to determine if the treatment is conducted as intended, reliability of an assessment measure, and blindness of the assessors.

In an earlier paper, Steven and Clark (1969) proposed the value of music therapy to be significantly effective in improving some pro-social behaviours of five male autistic children age between five to seven years old within a research setting, as measured by Rutterberg's Autism Scale. They argued as far back as 1969 that the next step in the demonstration of the effectiveness of music therapy is a study comparing this treatment to play therapy, or traditional 'office' psychotherapy with children with ASD. They argued that the crucial research question regarding the efficacy and efficiency of various types of therapy with children would benefit from such a comparative study.

This study deploys a randomized controlled comparative design (improvisational music therapy vs. free play session with toys), using a repeated measures design including the collection and analysis of descriptive and qualitative data to explore a range of behavioural changes concerning joint attention skills in children with autistic spectrum disorder. The treatment manual and standardized assessments were prepared to carry out which will be explained in detail in the following Chapter 4.

3.7 Hypothesis and preliminary research questions

The overall hypothesis for this study is that; 'finely tuned, sensitive, responsive and attentive use of music towards the developmental needs and state of the child with

ASD' will 'open and maintain the communicative channel (Adamson & McArthur, 1995)' with the child. The child's ability in joint attention will increase positively over time and musical attunement will play a role in improving joint attention behaviour of the child with ASD. Joint attention behaviour may be better in the music therapy condition than free play condition since music has long been noted to motivate children with ASD to participate in shared activities in music therapy literature. Musical and emotional synchronicity between the child and the therapist will be increased over time during the joint musical engagement. The presence of emotional synchronicity may be greater in musical play than in free play as music has the potential to be an inherently emotive medium.

Research Questions

1. Do children show observable and measurable changes in joint attention behaviour in response to improvisational music therapy?
 - 1.1 Are there any observable and measurable changes within one session when comparing the unstructured and structured approaches used in the session?
 - 1.2 Are there changes in response over time when comparing the early to late period of music therapy?
 - 1.3 Are joint attention behaviours significantly better when compared with a baseline period of recorded observation before music therapy began?
 - 1.4 Are joint attention behaviours better in music therapy when compared with free-play session?
 - 1.5 Can parents and professionals also identify behavioural changes concerning joint attention?

2. Are there any observable musical features in improvisational music therapy that characterize the engagement and maintaining of joint attention of the child and the therapist both within and across cases?
 - 2.1 What is the main musical feature in engaging the child into mutual play?
 - 2.2 Does musical attunement (the sensitive and responsive use of improvisation) appear to play a significant role in engaging the child into mutual play?
 - 2.3 Is there a developmental sequence in the mutual music making process that one can identify?

3. Treatment manual related questions; were the therapists able to follow the direction of the manual? Was it possible to apply the instructions of the manual to autistic

children as it was described? Did it work?

Chapter 4 will describe how the method and design of this study were developed in order to recruit participants and collect data relevant to these questions.

CHAPTER 4

METHODOLOGY

4.1 Design

This investigation was undertaken as a randomized controlled study, which also included the collection and analysis of descriptive and qualitative data to explore a range of behavioural changes in children with autistic spectrum disorder. The measurement of quantifiable dependent variables concerned with joint attention was essential in order to answer the research questions. Repeated measures, within subjects design was selected in order to determine whether improvisational music therapy is effective in improving joint attention behaviours in autistic children, when subjected to comparison with another condition, or a no-treatment control group. To date the claims that music therapy can help individuals with autism were mostly made by the therapist's own detailed clinical documentation (Alvin & Warwick, 1991; Berger, 1997; Brown, 1994; Nordoff & Robbins, 1971a; Robarts, 1993, 1996; Saperston, 1973). Due to the small numbers that met inclusion criteria and could be recruited to a study of this nature, the potential for recruiting a no-treatment control group was not considered viable. Even though children with autism are characterized by severe social, communicative and often cognitive deficits, they can vary greatly. Finding enough subjects with a diagnosis of autistic spectrum disorder, whose parents are willing to enroll then into a research – therapy trial is not easy. Therefore, allocating subjects randomly to two matched groups of children with comparable diagnoses, matching chronological age, mental age, verbal ability, sex, educational and therapeutic inputs, etc, would have been very hard to manage in the time-frame and context of this doctoral study. Such studies usually require multi-centre cooperation. Moreover, the danger of using a no-treatment group is that non-specific factors, such as the additional attention given to the child, may account for the effect of the treatment (Kasari, 2002; Robson, 1993; Wheeler, 1995). Therefore, a repeated measures, within subject design was selected as the most appropriate with a small sample.

Two discrete conditions were developed to be able to undertake a close comparison. The 'placebo' condition consisted of 12 free play sessions (approximately three months) using toys with the therapist with equal length structured and

unstructured parts. The experimental condition consisted of 12 improvisational music therapy sessions (approximately three months) of the same length and style as the free play sessions, and also with equal length structured and unstructured parts. The intended duration of the clinical trials was approximately seven to eight months for each child. This comprised a pre/in between/post treatment measure taken during one week on three separate occasions: before the trials began, in the changeover period from one condition to another, and at the end of the trials. The order, in which the subjects received the music therapy and the free play sessions, was randomly assigned. Some cases took up to eight months due to absences because of illness and holidays. In order to identify any potential carry over effects of the music therapy interventions and the free play sessions, half of the participating children were randomly assigned to the music therapy condition first, and then free play sessions later, while the other half were randomly assigned to the free play condition first, and then the music therapy condition later. The commencement of the therapy differed from child to child in a rolling programme of trials, consequential upon the differing referral time and the time arrangement at the clinic.

Every precaution to distinguish effects of two different types of interventions was undertaken. One is to avoid personal familiarity influencing, or biasing the therapeutic outcome. Therefore, for each child, music therapy and free play sessions were carried out by two different therapists. A team was formed in order to carry out this study, which consisted of two music therapists, a play therapist, and three research assistants (two music therapy graduate students and a music graduate). The role of each person in the team will be specified later in this chapter.

In order to establish consistency in the treatment and treatment procedure, a treatment manual was prepared (appendix 10.1) that provided specific guidelines and instructions for the treatment and placebo conditions. As described extensively in the literature review, the traditions and principles of improvisational music therapy using a psychodynamic approach, early infant-mother interaction models, and autism research findings have informed the structure and specific guidelines of this treatment manual. This will be explained more extensively in the procedure and therapeutic protocol section.

Data was analyzed to compare joint attention in both conditions, and to compare the use of unstructured and structured approaches. For the treatment measurements, DVD recordings of selected sessions were analyzed according to the frequency and the duration of the target behaviors in this study. For the pre/in between/post treatment dependent variables, three separate tools were employed:

- 1) 10 minutes of video recordings of mother - child free play at home were collected and analysed;
- 2) The Early Social Communication Scales (ESCS) were administered;
- 3) The PDD Behavior Inventory (PDDBI) was administered.

This will be explained in greater detail later in chapter 4.5 under dependent variables – pre / in between / post session measurements.

4.2 Subjects

4.2.1 Early intervention: pre-school age group

Ten children with autism (all males) completed the clinical trial. This study focused on early intervention in autism, especially the pre-school age group. In Korea, the age for entering primary school starts from six to seven years old. Most parents of children with developmental disorders tend to send their children to the school a year or two later than normal school age in Korea. Many of them prefer to send their child to a mainstream school with some classes for the children with special needs even for the first few years. It is quite typical in Korea that the parents of autistic children tend to seek a clear diagnosis for their child by visiting the child psychiatrist when the child reaches his/her second year, or the beginning of their third year. After the first diagnosis until entering the primary school are the most intensive years when the parents tend to focus on available treatment and educational programmes to promote their child's development as normally as possible. The researcher is very familiar with this process, since working in early intervention over a period of 10 years in Korea. Mundy and Crowson (1997) also argued that intervention, which was begun between the age of two and four years may be the most beneficial to the children with autism. Research in brain development (Zilbovicius et al, 1995) provides evidence that children with autism at three to four, displayed a delay in maturation of neurobehavioral systems associated with the frontal lobes, nevertheless by the age of six to seven the same children achieved normal values. As autism is a neurological and developmental disorder, they argue that early intensive intervention in the context of social interaction may have a direct and positive effect on neurological development. Even though the researcher was not prepared to deal with neurological aspects of the early intervention programme in this study, it is the researcher's belief that improvisational music therapy may have

positive effects on neurological, emotional, social, and cognitive aspects of development in the children of this young age. For these above reasons, the researcher decided to focus on a three to six year old pre-school age group (36 months to 83 months old). The youngest child was 39 months old (three years and three months), and the oldest were 71 months old (five years and eleven months old) when entering the trial. Therefore, all finished the trial within that age range. The individual child's age will be introduced at the end of this section. Below is the pooled data on the age, year and month information when the children entered the clinical trial. Table 4.1 reports the minimum and maximum ages of the 10 subjects, who finally completed the trials in this study, and also reports mean age and standard deviation.

Table 4.1 Age at entering the trial

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
Age on entry	10	3.03	5.11	3.7680	.9510

4.2.2 Background to referral and reasons for drop-outs

A total of 15 children (two female and 13 male) participated in this clinical study. Five of them dropped-out in the middle of the trials, while 10 of them (all male) completed the relatively long-term research trials. The five drop-out children that could not be included in this study will briefly be described together with the reasons for dropping-out. All of the participants were diagnosed by two child psychiatrists to ensure they met autistic spectrum disorder diagnostic criteria at the department of child & adolescent psychiatry, Seoul National University Hospital, using DSM-IV and ICD-10 criteria. All of them were clinically diagnosed with autistic disorder.

Child & Adolescent Psychiatry at Seoul National University Hospital is the renowned department for the diagnosis and treatment for childhood developmental disorders nationwide. The hospital is the part of medical school; therefore staff is open-minded and interested in supporting clinical trials such as the one undertaken for this doctoral study. Both the chief child psychiatrist and the clinical psychologist have acted as external advisors for this study. The researcher also worked there nine years ago and was well known to the staff, who fully cooperated in recruiting research subjects. However, the fact that it is a renowned hospital for ASD diagnosis and treatment nationwide had both an advantage and disadvantage for this trial. The hospital was one of the most reliable sources to recruit research subjects in Seoul. On the other hand,

many children come from a long distance only for diagnosis and regular check-ups, or short - term treatment. As one can easily predict, the fact that some of the children traveled long distances worked against 'long-term clinical trials' like this one.

Subject attrition

A primary reason for the high-rate drop-out rate was that both the mothers and children were traveling long distances and it turned out to be very tiring and unmanageable, especially as the mothers were traveling with young autistic children. All five children, who dropped out traveled long distances. Two of these five children dropped out for health reasons (hospitalization) in addition to the trouble of long distance travel. A third child's mother was working full-time and could not manage to bring the child after week 17 of their trials (out of a total of 27). The other two mothers withdrew their children for a number of reasons. First, they were traveling a long distance and by the time they got to the clinic, both the mother and the child were somewhat exhausted. Then both children started free play sessions first and the mothers observed how solitary their child was in free play sessions. The mothers also had a strong opinion on what the therapist / adults should do with their child. They were both very much into highly structured behavioral modification approach and did not approve the child-centered approach even though from the beginning it was explained fully. Two children were withdrawn at week 18, and the other three children at weeks five, eight, and twelve respectively.

Even for the remaining children, the return trip from their home to the clinic took a minimum of two hours up to five hours according to where each of them lived. Among the 10 children who completed the trials, three children lived outside of Seoul, and seven lived in Seoul. Seoul is a metropolitan city, which has expanded over the years. Even though some lived in the same city as the clinic, long distance and density of traffic still caused long travel times.

4.2.3 Childhood Autism Rating Scale (CARS), Social Maturity Scale (SMS) & Psycho Educational Profile (PEP)

The children with autism were recruited from the child and adolescent psychiatry at Seoul National University Hospital. In most cases, the parents and the children come to the hospital for the first diagnosis and then re-visit the psychiatrist for every three to four months for regular check-ups. Most children went through K-CARS, SMS, PEP, and four of them had the Autistic Diagnostic Observation Schedule (ADOS) at the hospital. Table 4.2 reports the pooled data of K-CARS, SMS and PEP.

Table 4.2 reports the minimum and maximum K-CARS, SMS and PEP scores

for the subjects in the group, who were assessed through these tools, giving the means and standard deviations.

Table 4.2 K-CARS, SMS and PEP Scores

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
K-CARS	10	32.00	42.50	36.1000	3.4059
SMS-SQ	7	47.40	71.00	58.8429	7.8017
PEP-DQ	7	60.00	89.00	70.2857	9.9744

K-CARS is the Korean translated version (1995, Kim and Park) of Childhood Autism Rating Scale (Schopler et al, 1988). K-CARS has interrater reliability of .94, internal consistency of .87 and test-retest reliability of .91. Standardization study for the K-CARS also strongly supported the construct and discriminant validity of K-CARS (Shin and Kim, 1998). Therefore, it is a highly reliable test most widely used as the diagnostic tool for children with autism in Korea. The cut-off score for diagnosing autism is 30 in original CARS, whereas in the Korean Version, it was found to be 28. Every participant's K-CARS score were equal to or greater than 32 in this study. The Social Maturity Scale (SMS) was developed by Doll, and was published in 1936 and 1953 (Doll, 1936b, 1953). Doll was considered as the founder of the 20th century adaptive behaviour assessment field, who worked at the Vineland training school for feeble minded children. Therefore, it is called 'The Vineland Social Maturity Scale' in the U.S. Based on the 5th revision of the SMS, Kim and Kim (1985) have translated this tool into Korean and undertaken a standardization of it. The SMS is a widely used test in child psychiatry in Korea. The SMS consists of six subscales; self-help, locomotion, occupation, communication, self-direction, and socialization. Social Age (SA) and Social Quotient (SQ) are obtained from the SMS. Only seven children were tested with SMS, and all seven showed marked delays in the socialization and communication subscales of this test. For example, one of the children was 39 months old when he had the SMS. His SA was 1.73 years old and SQ was 54.6%. Details of subscales were; self-help, 1.93; locomotion, 2.69; occupation, 2.30; communication, 0.75; self-direction, not applicable; socialization, 0.99. The sub-scores of SMS also clearly indicate diagnosis of autism as well. For convenience, only SQ is presented here. The Psycho Educational Profile (PEP) was developed by North Carolina University, translated and standardized by Kim (1995). From this assessment tool, one can obtain developmental age and developmental quotient. The PEP was only administered to seven children from which Developmental Quotient scores were obtained. Among the ten subjects, only four

subjects had ADOS and the ADOS result also strongly supported diagnosis of Autism. Prior to participating in the music therapy clinical trials, most subjects attended from two to six months for the Mother-Child Attachment Promotion Programme at the day-clinic of the hospital, which was designed to promote early mother-child interaction. Individual data is presented at the end of this section.

4.2.4 Inclusion and exclusion criteria

The subjects were recruited to satisfy the inclusion criteria below in order to participate in this clinical trial.

Inclusion criteria for this study were;

- 1) The subject should be age between three to six years old;
- 2) Using DSM-IV, ICD 10 criteria, the subject should be diagnosed with autistic disorder, and without diagnostic co-morbidity;
- 3) The subject should be able to visit and attend once a week session for seven to eight months;
- 4) If the subject is on psychiatric medication, the medication should be stabilized prior to the clinical trial and there should not be any change of medication;
- 5) If there were to be any changes regarding medication, education, or a treatment programme, the parents should notify the researcher prior to changes.

Exclusion criteria for this study were;

- 1) If the subject changes the medication during the clinical trial;
- 2) If the subject has diagnostic co-morbidity, for example, if the subject has profound learning difficulty, or has attention deficit hyperactivity disorder as well. The diagnosis of autistic spectrum disorder should be the primary diagnostic feature;
- 3) If the subject has previous experience of improvisational music therapy, or has been in music therapy, or play therapy recently;
- 4) The subject has play, art, or music therapy, while participating in this study.

Most children included in the study were in early special education, or the main stream pre-school programme (Kindergarten, or Nursery School), speech therapy, special physical education, when they entered music therapy trial. For most of the children, the educational and therapeutic input usually stayed the same throughout the research trial period even though there were some changes, such as changes of the therapist or teachers, or changes of school.

At the beginning of the study, the intended population was relatively high-

functioning autistic children, whose IQ was above 50. Only one child's IQ test result was available at the time of trial (KEDI-WISC¹) and an IQ test for children under 5 years old with ASD was not viable at Seoul National University Hospital at that time. Therefore, the professor of clinical psychology calculated an estimate of each child's mental ability based on the SMS, PEP, and K-CARS scores. Five children were verbal and five were pre-verbal.

Table 4.3 reports demographic data on the subjects and the scores from the various assessments. The codes for understanding the data in this table are as follows:

Sub = subject; Age = the age when the child entered the trial, year and month; MR = mental retardation; Lan = language ability, V= verbal, PV = pre-verbal; NT = Not Tested; KCARS = Korean Version of CARS Score; SMS = Social Maturity Scale, Social Quotient; PEP = Psycho Educational Profile, Developmental Quotient; ADOS = The Autistic Diagnostic Observation Schedule, NT = not tested, C = tested and confirmed as autistic; Med = Medication, N = no medication, Me = stabilized medication throughout the trial period, CM = changes in medication; Eco = home economic situation, M = middle class, L = low income family; Sib = sibling, N = no sibling, 1/No = 1 normal sibling, 1/ab = 1 sibling with some problems.

Table 4.3 General Information on Subjects

<i>Sub</i>	<i>Group</i>	<i>Age</i>	<i>MR</i>	<i>Lan</i>	<i>KCARS</i>	<i>SMS</i>	<i>PEP</i>	<i>ADOS</i>	<i>Med</i>	<i>Eco</i>	<i>Sib</i>
A	1	3.04	Mild	V	34.0	NT	64.0	NT	N	M	N
B	1	3.11	Mild	V	32.0	63	89.0	NT	N	L	1/Ab
C	1	3.11	Severe	PV	36.0	NT	78.0	NT	N	M	1/Ab
D	1	5.03	Severe	PV	38.5	47.4	NT	C	Me	M	1/Ab
E	1	5.08	Mild	V	39.0	NT	64.5	NT	N	M	1/No
F	2	3.03	Severe	PV	42.5	71.0	60.0	C	N	M	1/No
G	2	3.09	Severe	PV	37.5	54.6	68.0	C	Me	L	1/No
H	2	4.05	Mild	V	36.5	64.3	NT	C	N	M	N
J	2	5.11	Normal	V	32.5	57.0	NT	NT	CM	M	N
K	2	3.03	Moderate	PV	32.5	54.6	68.5	NT	N	M	1/No

The results revealed that of the subject group that finally completed all the trials, one was within normal IQ range, and four children were verbal and within mild to moderate mental retardation range. The other five children were pre-verbal and they

¹ Korean Educational Development Institute-Wechsler Intelligence Scale for Children: This is Korean translated and standardized version of WISC-R.

were within the moderate to severe mental retardation range.

Two children were under medication, one with risperidone, another with methylphenidate throughout the trial period. One child was put on methylphenidate half way through the music therapy trial and the mother failed to notify the researcher about the medication during the trial. Retrospective analysis of the child's behaviour revealed that the child became inhibited in his response, and rather depressed in his behaviour. This change in behaviour was also noted by the nursery teacher. This response is occasionally noted during the early phase of methylphenidate, until doses are adjusted. In this case, the introduction of medication may have had a short term negative effect on behaviour during the experimental condition. This will be addressed in Chapter 6 (individual case study) and Chapter 7 (discussion section).

Eight children came from low middle to middle class families and two were from a low income family. 70 % of mothers and fathers were University Graduates. 30 % were between primary school to high school graduates. Two of the ten mothers had clinical depression and were, at some stage during the trials, under anti-depressant medication. The clinically depressed mothers were in their second marriage and had the autistic child from the second marriage. 30 % of children had no sibling, 70% had one sibling, and 30% had a sibling with some developmental or behavioural problems to a lesser degree than the autistic child. Children were randomly assigned to either group 1 (music therapy first and free play sessions later) or group 2 (free play sessions first, then music therapy later).

4.3 Setting

The clinical trials were carried out in the researcher's own therapy clinic (Jinah Kim Music Therapy Clinic). The clinic is centrally located in Seoul and has convenient access to public transportation, both subway and buses. It is only two minutes walking distance from the subway station and less from the bus stops. The location of the clinic had important value since most subjects for the trial were very young age and came from a long distance. It is a relatively small, but well-equipped clinic for clinical trials like this. The clinic consists of one therapy room, a small storage room, a waiting area, and a bathroom with toilet, wash-basin, and a shower.

The main clinical trial procedure including interviews with potential subjects and their parents, the ESCS tests, music therapy and free play sessions, were carried out

in the therapy room where there was an upright piano near the window, a table with two small chairs for individual sessions. Two dome cameras and a tiny microphone were built-in on the ceiling, but not easily noticeable. A tall tree is located on the left corner of the room. Opposite to the door, there is a large window, overlooking the street. Most children were very fond of this window, often standing, or sitting on the footstall of the window looking outside. On the right hand side, there is a large cabinet for storing various instruments. During the clinical trials, the cabinet was locked to control the number of instruments used and avoid unnecessary distraction. During the free play session, all instruments were removed from the therapy room, except the piano. The piano was the largest object in the room; therefore it was not possible to remove it. It was locked and served as furniture to display toys on it.

In the waiting area, there is a sofa, where the mother of the autistic child can wait. Opposite side of sofa, there is a monitoring area, where the laptop computer and controlling equipments for DVD/Video recording are located. The waiting area is an open space where the mother of each child was able to watch every session through TV monitor if she wished.

4.4 Equipment

The equipment used in both the music therapy condition, and the free play condition for this study were decided and fixed, in order to achieve consistency in both conditions, and to permit possible replicability.

4.4.1 Instruments in music Therapy

The range of musical instruments was comparable with toys used in free play sessions. Instruments were chosen based on the researcher's clinical experience with children with ASD.

- Upright piano (Samick)
- A standing cymbal (Istanbul Crash Medium Thin Cymbal, 16 inch)
- A Sonor 20 inch timpani drum (Sonor)
- An alto xylophone, diatonic (Sonor)
- A chroma harp (Samick)
- A pair of paddle drums (Remo)
- 4 different coloured toy handbells (C =Red, E = Yellow, G = Sky Blue, A= Blue)
- 3 different colour tone bar (C=Red, E=Yellow, G=Sky Blue)

- A small guiro
- A pair of egg shakers
- A pair of finger cymbals
- A pair of Nordoff-Robbins (N-R) horns and a pair of whistles and bird calls
- Two pair of beaters; large and small ones.

Five large instruments (piano, drum, cymbal, xylophone, chroma harp) were displayed in the room and were easily reachable by the child. Paddle drums and N-R horns were displayed on the upper part of the piano. Other smaller instruments were displayed on a shelf that was out of reach of the child, but easily reachable by the therapist. The basic range of instruments was kept the same, with the occasional addition of a single instrument as long as it belonged to the same range of an instrumental group. For example, at a later stage, a Kazoo was added. Kazoo is the part of basic wind instrument that belongs to the same group as horns and whistles.

4.4.2 Toys in free play sessions

The range of toys used in this clinical trial was also consistent throughout each 12 weeks trial. The range of toys was comparable with the instruments used in music therapy condition. Toys were carefully selected by 3 principles. First, the researcher considered the developmental stage and needs of the children, and discussed them with the research team, and with another music therapist. Second, a search of the autism literature found out what was commonly used in a play condition with children with ASD in this age group (El-Ghoroury and Romanczyk, 1999; McArthur & Adamson, 1996; Watson, 1998; Williams et al, 1999). Third, the researcher consulted play therapists and listened to their recommendations.

- A doll house set (a family (a man, a woman, a little girl, a little boy, and a dog), kitchen utensils, furniture etc)
- A big dump truck
- A big bulldozer
- A Lego block set
- A pair of middle size balls
- 3 different tops (a Picachu top, two thunder-blade tops)
- 5 different colours of play dough (Red, Yellow, Blue, Green, Brown)
- A peg kitchen set (wood fruits, vegetables and bread, and a wood knife to cut them in pieces and stick together again)
- A range of different shape and size mini cars in pairs (police car, fire-engine, leisure

cars etc)

- A range of different puzzles
- Two small transformative Robots – From Robot to Car
- A pair of small balls

As in the music condition, five large toys (a doll house set, a dump truck, a bulldozer, a Rego Block, a pair of balls (yellow and green)) were displayed in the room that were easily reachable by the child. Puzzles and medium size mini cars (a pair of police and fire-engine) were displayed on the upper part of the piano. The piano was locked and used as part of the furniture in free play sessions. Other smaller toys were displayed on a shelf that was out of reach of the child, but easily reachable by the therapist. The range of toys was kept the same and consistent. Compared to the music condition, however, more toys were added in the free play sessions for each child. For example, wood puzzles for + 2 years old were prepared at the beginning. It was useful for some children, but it was too easy for high functioning children. Later, various types of puzzles were introduced according to the child's interest and developmental stage. In addition to wood puzzles, normal puzzles were added - from 6 pieces to 58 pieces. Mini cars were common toys often added according to the circumstances.

4.4.3 Equipment for recording and coding

Every effort was made to be as unobtrusive as possible with the video/DVD recordings during this research. Most sessions including pre/post treatment sessions were video, or DVD recorded (except home video) using two dome cameras hidden on the two opposite side of ceiling in the therapy room. Recording equipments consisted of two dome cameras, a built-in microphone on the ceiling of the therapy room, a camera controller with joy stick, a sound mixer, a DVD and VHS combi recording machine and a TV in the waiting area.

a) Sony digital video camera recorder DCR-PCI: A small hand-carried video camcorder, capable of recording in the normal lighting of most home situations, was used to record the mother and the child free play at home. The camcorder was hand-held due to the fact that the children were often distracted by the stand of the camcorder, or the camcorder itself. A time code generator was on the screen of the camcorder and the camera operator was instructed to obtain approximately 10 minutes of usable recording in pre/in between/post treatment periods respectively.

b) Samsung combi dome camera SCC-641: This is a tiny high-tech camera hidden inside a small dome. Two dome cameras were used in order to capture reliable views of the child in any position in the room. The camera has an automatic light adjusting sensor, zoom lens, and is operable at 360° degrees. The two dome cameras were built-in opposite to each other on the ceiling.

c) Sennheiser, 608 pin type microphone:- This microphone is a highly sensitive sound condenser, which can absorb sound produced at 180° degrees. It was designed for musical instruments, and can reliably collect even soft vocal, whispering sounds, and normal conversation.

d) Modoo free AV selector MS-3000: This is the audio video selector for the camera selection in this study. There were two cameras used alternatively according to the whereabouts of the child in the therapy room. The camera operator can choose one camera over another by pressing the corresponding button.

e) Samsung system controller SSC-1000: This is the camera controller with a joystick, which can move the camera up and down, left and right, and zoom in and out.

f) Behringer EURORACK MX 602A: This is the sound mixer, which can expand the sound through an amplifier, or receive the sound signal from the microphone and then transform the electrical signals to the video recorder. The DVD video combi recorder does not have a device to receive the sound directly from the microphone, therefore the sound mixer has been used to transform and connect the sound collected from the microphone to the DVD video combi recorder.

g) Panasonic dome speaker system TH-21VA2: This is a 25 inch TV monitor to view both on-going and recorded sessions for viewing and coding.

h) LG LCR-S 4800 recorder combi (DVD –RW/-R recording combined with 6 HD Hi-Fi Stereo VHS): This is a DVD and VHS recording machine for viewing and recording. It can reliably copy DVD ↔ VHS. It has in-built time-code generator, which consists of 10 digits, two for specifying chapters of DVD, two for specifying time sections, two for hours, two for minutes, and two for seconds. It has the remote controller, which can play the recorded sessions 2, 4, 8, 16 and 100 times

faster, and 2, 4, 8 and 16 times slower. Most sessions were DVD recorded, except for two children who participated in the early stages of the research. During these first four months of research, an old model of video cassette recorder was used to record the session. Using DVD instead of video had advantages, such as a precise time recording. When one uses the videotape, there can be some time discrepancy among coders. For DVD, the time coding is more precise and exact. Therefore, for reliable time coding, VHS recorded sessions were edited, and transferred to DVD by four minute time frames. Therefore, all of the coding was done by viewing DVD recording, either DVD – RW, or –R type. For normal speed viewing, one can both obtain visual and auditory data. For coding some variables, such as eye contact, joy and emotional synchronicity, it was necessary to slow down the replay speed to two or four times slower to achieve accurate observational recording. However, when the DVD was played slower than normal speed, only visual data was obtainable.

4.5 Recruitment: ethics and informed consent

The subjects were recruited from the child & adolescent psychiatry department at Seoul National University Hospital (SNUH). Initially, the day clinic staff (child psychiatrists, the chief child psychiatric nurse, the head teacher in special education) selected research subjects from the out-patient lists and then introduced and explained about this clinical trial and the benefits of it to the parents. After obtaining information on this clinical trial, the mothers voluntarily contacted the researcher and we arranged the time for the first interview in the clinic. On their first interview, the researcher fully explained the procedure of trial, the benefits of music therapy and free play sessions, inclusion and exclusion criteria, trial terms and conditions, rights of the participants and confidentiality. As this current study is primarily concerned with the effects of music therapy, in order to avoid influencing the parents' expectation and preconception for the two different conditions (music therapy vs. free play), the researcher explained that these trials could be an opportunity to find out to which medium (either music, or toys) each child responds better, therefore using the clinical trial as the baseline or 'testing ground' for choosing a clearly beneficial intervention for the future. When the parents agreed to the clinical trial, they were given at least one week to sign the parent's consent form (appendix 10.2), which explained the purpose of research, inclusion and exclusion criteria, procedure, measurements and participants' rights. In addition, parents were asked to sign a 'video consent form (appendix 10.3)'. To which they all signed. At the

time the researcher formulated the video consent form, the researcher had no knowledge about DVD, and did not possess the LG LCR-S4800. The consent forms were in Korean as all the subjects were Korean.

The three different types of pre/in between/post tests for each child were used; the video recording of mother-child interaction at home (MPIP), the Early Social Communication Scales (Mundy et al., 1996, 2003), and the PDD Behavior Inventory (Cohen & Subhalter, 1999).

During the first week, one of the assistants scheduled with the mother to visit each child's home and video-filmed a mother-child free-play interaction in the home situation for 10 minutes. The administration of the ESCS was scheduled and carried out during the first week in the clinic. The PDDBI was given to both the mothers and professionals (teachers in special education, speech therapist, chief child psychiatric nurse etc), and they were expected to complete and return the PDDBI within two weeks. The children were randomly assigned into two groups. One group was to have 12 sessions of music therapy first, and then 12 sessions of free play later. The other group had 12 sessions of free play first and then 12 sessions of music therapy. After finishing the first trial of 12 weeks in either condition, the children were again video-taped for 10 minutes of free-play at home with their mothers. During this one week wash out period, the ESCS and the PDDBI were also administered. The second trial of 12 sessions of the alternate condition then commenced and was completed. Then the children had a final 10 minutes of videotaping of mother-child interaction at home, the ESCS and the PDDBI during the week following the end of the clinical trials. The total length of trials differed from child to child, and ranged between seven to eight months. A typical reason why the period of trials was extended was due to normal short-term childhood ailments such as overnight sickness, especially during the winter and the periods of seasonal changes.

After completing all the trials, the parents (often only the mothers) were given a last interview with the researcher. The results and findings of the study were reported to the parents and specific issues concerning each child's developmental stage and further recommendations for education and therapy were discussed. The parents were given the choice to continue music therapy after the clinical trial if they wished. Data collection and analysis were undertaken by three of the research team, two research assistants and the researcher throughout the research process. Details of data collection will be discussed fully in the next section.

4.6 Dependent variables: pre, in between and post session measurements

4.6.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

PDDBI (Cohen & Subhalter, 1999) is an informant-based rating scale designed to assess the responsiveness to intervention in children with pervasive developmental disorder (PDDNOS, Autism, Asperger's, PDDs). It is designed to assess both adaptive and maladaptive skills and to deal with complicated issues on behavioural change in form and probability with age. The adaptive behaviour section is designed to assess the core features of autistic spectrum disorder such as joint attention skills, pretend play and referential gestures. Therefore, the sub-scale concerned with social approach behaviours in the adaptive behaviour section has been of highly relevant interest for the purpose of this study. Even though only the joint attention related section was used in this study, the researcher translated the whole section for further use. There were two versions of PDDBI; Parent PDDBI, and Teacher PDDBI. Therefore, it was used as a dependent variable at pre-treatment, in-between treatment and post-treatment, and was completed by both parents and professionals. Cohen et al, 2003 confirmed that the inventory has a high degree of internal consistency. Interrater reliability was better for adaptive behaviours than for maladaptive behaviours. The structure of the PDDBI and the good level of construct validity were confirmed by factor analyses. The study by Cohen et al (2003) concluded that PDDBI is both a reliable and valid scale for assessing children with PDD and is useful in providing information not typically available in most instruments (Cohen et al, 2003).

4.6.1.1 Procedure

The PDDBI was used as a pre/ in between/ post measurement, and permission was obtained from Ira Cohen in New York to use the inventory in the study. The researcher translated and back-translated (Dr. Cohen specifically requested back-translation in order to ensure the correct translation) of the whole section of the PDDBI (both parent's and teacher's part). Consultation with Prof. Shin at Seoul National University Medical School (A clinical psychologist), who reviewed the tool, resulted in standardizing the inventory in Korean. The inventory was sent to several different people to review, including a professor, a primary school teacher, a teacher in special education, and a speech language therapist, and a mother of the autistic child. Feedback was integrated into the Korean version of PDDBI. After that, Prof. Shin reviewed it in its latest form and recommended some amendments, and then the final Korean version

of PDDBI was completed. The PDDBI consists of two sections. Section one, maladaptive behaviors consists of seven sub-headings, section two, four sub-headings. The original English version of the Parent PDDBI (appendix 10.7) consists of a list of 188 sub-components, and the Teacher PDDBI (appendix 10.8) of 180 sub-components (for the English version in the appendices, only the social approach behaviours sub-scale is included). In the course of translation, the grammatical and phonological difference between English and Korean language had to be considered and adapted. For example, for sub-scales of semantic/pragmatic ability, there is an item for 'spontaneous usage of sentences with the verb, past-participle'. Korean grammar does not have 'past-participle'. Therefore, some items were not applicable to Korean version. The Korean version of Parent PDDBI (appendix 10.5) consists of 183 sub-components, and Teacher PDDBI, 176 (appendix 10.6). Only the scores of social approach behaviours in section two will be presented here in this study. As the social approach behaviour lists deal with the child's behaviour, and not with characteristics of certain language, the Korean version has the same sub-components as the original version.

The PDDBI has been used three times during the clinical trials as pre-treatment, in between conditions and post-treatment measures. Care was taken to ensure that both parents and professionals completed the form and returned it within two weeks from the day they had received it. The pre-test was undertaken one week before the commencement of either the music, or the free play condition. The 2nd form was sent out after the 12th session (on the last day of either condition) and returned within a week. The 3rd form was sent out on the last day of trial, and was returned also within two weeks.

The PDDBI consists of a seven to eight pages long rating scale and both the parents and the professionals were asked to fill out every section of the PDDBI, even though I use only the social approach sub-scale from section two in this study. Both the parents and professionals were not informed about which section was the focus of this clinical study in the PDDBI. Completion of the PDDBI takes about 30 minutes to an hour. Parent PDDBI was completed by the mothers of the autistic children, and Teacher PDDBI was completed by the professionals who were involved with the children either in education, or in some form of therapy. The PDDBI was sent to the professionals through the mothers and were collected either by mothers, or via mail service. The relevant professionals who filled out the PDDBI were selected by the mothers after the consultation with the researcher. The mothers were asked to identify a teacher, or the therapist who has been seeing the child more than six months initially, and had known

the child very well. However, some children did not stay with one programme for more than three months, or the child stayed with the programme, but the professionals were changed. Therefore, the minimum period three months of knowing the child was required in order to fill out the PDDBI form and the professionals were required to have some knowledge and experience with autism. The researcher also sent the professionals a letter explaining ‘coding guidelines’ for the PDDBI along with the PDDBI form. The professionals, who were experienced with autistic children, understood the guidelines well, and some called the researcher to check on the precise meaning of specific points in the checklist.

All mothers were able to observe every sessions in both conditions (music therapy vs. free play) through a TV monitor. All professionals who filled out the form were only informed that the children were in music therapy clinical trial for approximately seven months, and every three months the PDDBI would be sent out to them. Therefore, they were all blind to the experimental condition.

4.6.1.2 Coding

The sub-scale of social approach behaviours in section two of the PDDBI was selected and used in this study. The reasons for selecting the sub-scale of social approach behaviour was that this sub-scale well represented not only the working definition of joint attention of this study, but also assessed core features of autism disorders such as joint attention skills, pretend play and referential gestures. The social approach behaviours (higher scores indicative of better social skills) assesses non-verbal social behaviours, including various forms of eye contact, positive affective social interactions, use of various forms of simple and complex gestures in relation to people and objects, social interactions and play, self-control, imaginative play, empathy, and imitative behaviours. The subscales consisted of a variable number of behaviour categories that best represent that subscale. Each category in a subscale consists of exactly four items, or exemplars of that category, and each of these category items is rated on a zero to three Likert scale (0 = never; 1 = rarely; 2 = sometimes/ partially; and 3 = often/typical). Items that are no longer applicable, but once were, are coded “U” for “used to”. This information is used for clinical purposes only and does not enter into the scoring. If the informant (the mothers and the professionals) did not know if an item is present in the child’s behaviour, a question mark “?” is coded. Both “?” and “U” are treated as zero.

4.6.1.3 Coding Procedure

The PDDBI has the easiest scoring system for pre, in-between and post treatment measurements in this study. Dr. Cohen, who designed and created the PDDBI, provided the PDDBI coding spreadsheet programme on MS Excel. Upon receiving each PDDBI checklist, the researcher entered sum scores for each category of each scale indicated under “raw scores”. The computing system of the PDDBI, then automatically show the pooled scores of each sub-scale, then the total raw scores for the whole PDDBI. For the sub-scale of social approach behaviour in section two of PDDBI, the higher the score, the greater improvement in joint attention behaviours, it represented.

4.6.2 Early Social Communication Scales (ESCS)

The ESCS (Mundy et al, 1996, 2003) was originally designed to assess individual differences in nonverbal communication skills in young children age between six months up to thirty months old. The ESCS is a video taped structured observation measure that requires about 15 to 25 minutes to administer. The ESCS is known to give behaviour ratings for three categories of early social-communication behaviours; joint attention, behavioural requests and social interaction. The abridged version of the ESCS was used in this study, which was designed as a more practical research instrument, as well as a clinical tool.

To date, it has been mainly used, a) to differentiate between diagnostic groups; b) to make longitudinal predictions of language outcomes in children with autism (Kasari et al, 1990; Mundy, Sigman and Kasari, 1990; Siller & Sigman, 2002); c) to make correlations with intervention, joint attention and language development (Bono, Daley and Sigman, 2004). University of California Los Angeles autism researchers (M. Siller, personal communication, 2004, 2005) have been using the ESCS as an outcome measure for an intervention program of autistic children they have been running. As the research subjects were age between three to six years old, and most of the subjects had rather limited language skills, the ESCS appeared to be a good choice for the purpose of this research.

4.6.2.1 Procedure

The ESCS manual and CD were obtained from P. Mundy, Miami University, U.S., in 2003. After a careful study of the ESCS, and personal consultation with an experienced researcher on autism at UCLA, the researcher and assistants self trained to carry out the ECSC consistently. First, we used the role play to administer the ESCS to each other, and then began to administer the ESCS to the normally developing infants

aged between eight to thirty months. Only after administering the ESCS to the normal infants did we begin to administer the ESCS to the research subjects. This training took about three months. After having done the first three subjects' ESCS administration in this research, the researcher sent the DVD to the experienced researcher of UCLA (M. Siller, 2004, personal correspondence) to examine and to give feedback and recommendations.

The researcher trained two research assistants to do the ESCS administration, who were blind as to which group the subject they were evaluating had been assigned. During the ESCS, the tester and the child sit face to face at a table, with various toys. A set of toys, which is visible to the child, was placed to the right of the experimenter, but out of reach of the child. Posters were placed on the walls 90 degrees to the child's right and left, and approximately 165 degrees behind the child to the right and left. The child is presented with a set of three wind-up toys (three trials each), three hand-held toys (three trials each), opportunities to play a tickle and a turn-taking game (two trials), opportunities to play with a hat, comb and glasses (3 trials), an opportunity to look at pictures on a book with the tester (1 trial), and two sets of gaze-following trials. The tester presents toys one by one to the child. It is highly structured interaction, involving looking, showing, pointing and prompting. The ESCS was used three times as pre/ in between/ post measurements (for more details, see appendix 10.10 for the ESCS manual).

4.6.2.2 Items necessary to administer ESCS

- Five wind-up mechanical toys (three toys for the object spectacle task and two for plastic Jar task)
- Three hand held toys (e.g. pop-up puppet)
- Ball
- Car
- Picture book (large with distinct pictures)
- Hat
- Comb
- Glasses
- Clear jar with a screw-on the lid (approximately six inches tall)
- A table and three to four chairs
- Video recording equipment

4.6.2.3 Coding

The ESCS yields frequencies of behaviour scores in six categories (Mundy et

al, 1986, 2003):

1) Initiating Joint Attention (IJA)

Low:

Makes eye contact while manipulating toy;

Alternates eye contact between active mechanical toy and tester.

High:

Points to active mechanical toy, or distal objects in testing room;

Shows objects (raises objects) toward the tester's face.

2) Responding to Joint Attention (RJA): The percentage of trials the child correctly turns head and eyes in direction of tester's point.

Low: Following proximal points using picture book

High: Following the line of regard using poster on the wall

3) Initiating Behavioral Requests (IBR)

Low:

Makes eye contact when object is moved out of reach, or reaches to objects out of reach.

Makes eye contact while reaching to objects out of reach.

High:

Points to inactive objects on the table, or to the collection of visible, but out of reach toys.

Gives inactive toys to the tester.

4) Responding to Behavioral Requests (RBR)

The percentage of trials on which the child correctly responds to the tester's gestural and verbal request (e.g. 'give it to me').

5) Initiating Social Interaction (ISI)

Initiates turn-taking when ball or car was placed in front of the child.

Initiates tease by engaging in a prohibited act while making eye contact with the tester.

Initiates song/tickle

6) Responding to Social Interaction (RSI)

Low: responds to song/tickle game by making eye contact, act, or appeal (eye contact with act) after song/tickle was stopped.

High:

Total turn-taking response = ball score + car score. Zero for no turns, one for one to three turns, two for four or more turns.

Total response to social invitation = hat, comb, glasses

In the working definition of the ESCS, Mundy et al (1996, 2003) states that joint attention behaviours refer to the child's skill in using non-verbal behaviors to share the experience of objects or events with others. Behavioral Requests refers to the child's skill in using nonverbal behavior to elicit aid in obtaining objects or events. Social Interaction behaviors refer to the capacity of the child to engage in playful, affectively positive turn-taking interactions with others. Behavioral Requests also involves the coordination of attention between objects or events and others, however, it serves the purpose to use others to obtain something for oneself. For the autistic population, it is often well-observed behaviours. For example, the child may lead the adult by hand to the refrigerator and make the adult get orange juice for him/her. This involves the object and others, but does not involve sharedness of whatever experience the child might be having. Siller (M. Siller, 2005, personal correspondence) informed the researcher that UCLA researchers stopped coding RBR because it might measure compliance of the children rather than social understanding.

The working definition of joint attention for this study differs slightly from the original definition in the ESCS as presented in the previous chapter. Joint attention behaviour as described in this music therapy study, is defined as:

A three-way exchange that involves the child (self), another (the therapist) and objects either in musical form (instrumental or vocal joint engagement), or in play. This may, or may not be expressed in visual focusing between people and objects, but will display the interactive state of joint engagement either passive, or coordinated (adapted from Kasari et al (1990) & Bakeman and Adamson, 1984).

In this study, only 'Initiating Joint Attention (IJA), Responding to Joint Attention (RJA), Initiating Social Interaction (ISI) and Responding to Social Interaction (RSI) are presented, as they are the most relevant criteria for the working definition of joint attention in this study. .

4.6.2.4 Coding procedure

The interaction between the tester and the child during the ESCS administration was DVD recorded and analyzed on the coding sheet (appendix 10.11) according to the coding procedure. The period of interaction with each child was approximately 25 to 30 minutes. Behaviour ratings were collected from the ESCS DVD by trained observers (the researcher and one of the research assistants). The ESCS was

primarily coded by the research assistant, who was blind to which group the subject he was evaluating had been assigned. For independent coding, the researcher trained herself first, and then trained the assistant from the five sample selection of ESCS administrations. For inter-observer reliability check, 25 out of total 30 ESCS administrations were used to compare (more than 80% of ESCS DVD was used). The ESCS has been used for a variety of studies before, and reliability has been shown. The mean generalizability coefficient of this measure was .90. with a range between .73 and .98 in Mundy and his colleagues' study (Mundy et al., 1990). For precise coding, the DVD was often watched at 1/2, or 1/4 of real time speed, using DVD / VHS combi player (LG LCR-S4800) and a TV monitor (Panasonic TH-21VA2). For coding an ESCS DVD, one and a half to two hours were needed in general. The more complicated cases where the child with high-functioning ASD displayed more responses, the more time were needed for coding.

4.6.3 Mother Play Intervention Profile (MPIP)

The Mother Play Intervention Profile (MPIP) was a Likert scale that was designed to assess how the mothers are interacting with their child with ASD during casual play in the home situation. The rating scale had 6 items and was filled out by the observer via viewing 10 minutes of video recordings of mother-child free play interaction at their home. It was designed by the researcher and Tony Wigram (Kim & Wigram, 2004) to measure behavioural characteristics of the mothers and the children with ASD in a casual home situation.

4.6.3.1 Procedure of mother-child free play at home

The research assistant did most of the home video filming, and was instructed how to film prior to home visits. In a few cases, the researcher visited and did home videoing when the time arrangement between the mother and the assistant was difficult to manage. Every effort was made to be as unobtrusive as possible. A Sony digital video camera recorder DCR-PC1 was used. The camcorder was hand-held due to the fact that the children were often distracted by the camcorder stand, or the camcorder itself. The time code generator was on the screen of the camcorder. The camera operator was instructed to obtain approximately 10 minutes of usable recording in pre treatment, in-between treatment and post treatment periods respectively, stopping when the estimated time period had elapsed, regardless of the subjects' activities at that moment. During the home filming, sometimes, the recording had to be stopped when the child became

aware of and was preoccupied with the camcorder. Otherwise, filming continued throughout the 10 minute period without a break.

All recording sessions took place in the children's homes. They were scheduled at the mother's convenience. The research assistant visited their home and visiting usually lasted between half an hour to less than an hour including the 10 minute filming period. Prior to the home visit, the mothers were informed that we were interested in observing how they were with their child at home. They were told that we needed a video recording of typical informal play between the mother and the child at home, not records of their 'best', or exceptional ones. Each child had three home video sessions; the time and the date of first data collection session was scheduled a week before the commencement of either music therapy, or free play trial at the mothers' convenience. The second data collection was scheduled the week following the last session of the first series of trials (either music therapy or play), and the last data collection was scheduled for the week following the last session of the second series of trials (either music therapy or play).

4.6.3.2 Conditions for the MPIP assessment

Mothers were asked to play with their child as they might if they had a free time to play with the child at home. The researcher also informed the mothers that we were interested in dyadic interaction between the mother and the child, not between them and other family members, or neighbors. Therefore, it was recommended that while the mother and the child played in one area (mostly in the living room), the other members of family should stay away from that area for the period of filming. In most cases, it was not a problem, but in a few cases, other members of the family (such as a sibling, or a neighbor) were also present in the video film for short, transient periods as well. In the nature of field research, such occasional intrusions were unavoidable. There was no restriction on play materials.

4.6.3.3 Coding

The MPIP rating scale has six categories and each category is rated on a one to four Likert scale (1 = Almost None of the Time; 2 = Occasionally; 3 = Quite Often; 4 = Most of the Time). As the coding was done by watching 10 minutes of DVD recording, it was decided to define the approximate portion of the time for coding:

- 1 = less than 1/4 of the whole time span
- 2 = between 1/4 to 1/2 of the whole time span
- 3 = between 1/2 to 3/4 of the whole time span

4 = more than 3/4 of the whole time span.

However, the exact time coding was not required and the coding was mostly dependent on general impression of the contents of interaction and perception of the coder.

Categories:

- a) The degree to which the mother structured the play: This consisted of the mother preparing play material, where to play and how to play etc.
- b) The degree to which the mother was active in playing: This consisted of the mother giving gestural, facial and verbal instruction to the child.
- c) The degree to which the mother was passive in playing: This consisted of the mother's ability to allow the child's lead, to read the child's cues and action, to understand what the child's needs and wants, and to demonstrate the capacity to respond appropriately.
- d) The degree to which the mother initiated interaction: this measures how often the mother initiates interaction with the child in the whole interaction episodes with the child.
- e) The degree to which the child initiated interaction: This measured how often the child initiates interaction with the mother in the whole interaction episodes.
- f) The degree to which the mother offered social cues: This consisted of how often the mother offers a social cue during the free play at home.

Categories of a, b, f are similarly linked together. The coding of b and c is also connected. If the mother is often active, the mother can not be often passive at the same time. d and e are also connected together so the coder has to decide who is initiating more and balance the score for d and e.

4.6.3.4 Coding Procedure

The video recording of mother-child interaction at home was then transferred to DVD -RW. For coding, the DVD was watched at full speed for 10 minutes using a DVD / VHS combi player (LG LCR-S4800) and a TV monitor (Panasonic TH-21VA2). With this equipment, coders can play DVD at variable speeds from 1/16 real time to 100 times real time, forward and backward, while both maintaining the picture and displaying the current time code. There were no set guidelines for coding and the coder can play back and forth as much as s/he likes.

The MPIP was primarily coded by the researcher. For the inter-observer reliability, more than 30 % of DVDs were coded independently. For independent coding, I have trained myself first, and then trained my assistant from the sample selection of home DVDs.

4.7 Treatment procedure and therapeutic protocol: Improvisational music therapy vs. free play

The present clinical trial was carried out as repeated measures, within subject comparison design, in which each child had free play sessions with toys as a control condition to compare with improvisational music therapy sessions of the same length. Children were randomly assigned into two groups. One group had music therapy first, and then free play later and another group vice versa. In order to specifying the treatment procedures and allow the therapist a systematized direction for proceeding in sessions with the child, a treatment manual (appendix 10.1) was prepared and used.

4.7.1 Design of intervention

4.7.1.1 Frequency and length of the session

The sessions in both music and free play conditions were carried out for approximately 30 minutes, once a week 12 consecutive times. The frequency of the treatment was chosen as children with autism typically have once a week music therapy sessions. A weekly session is also the most manageable way for both the parents of the children and the research team. Twelve sessions for each condition were chosen for the following reasons, from clinical experience and from the evidence of other therapists work. A 12 week session is the minimum length of short-term therapy work that can have some cumulative therapeutic effect on children with autism. From clinical experience, the researcher has known that the severity of the children's condition requires a certain period of regular treatment. Basic therapeutic boundaries were kept consistent such as having therapy on the same day and time of the week with the same therapist for each condition. Two therapists were employed in order to carry out two different conditions for each child. A half an hour length of each session was chosen; considering the children's chronological and developmental age and the range of their attention span, a half an hour session seemed most appropriate length.

4.7.1.2 Unstructured vs. structured play

The sessions were divided into two sections each lasting approximately 15 minutes. In both the music therapy and the free play session, the primary task of the therapist was to engage the children at their level and interest, and then expand the children's experience by introducing some structure such as modeling and turn-taking activities. Therefore, during the first half of each session, the therapist was instructed to allow the child to lead the interaction between them by following the child's behavioural cues and interests, and attending to the child's focus of attention. In the first half, the therapist tried to share the object of the child's choice and the experience of that object with the child. During both the free play with toys condition, and the music therapy condition, the session began with the therapist joining the child's activity and focus of attention instead of giving directions, or going against the child's will.

The second half of each session began with the therapist gently offering the child some structure in their interaction such as turn-taking and modeling within the focus of attention, interest, and tolerance of the child. When guiding the child to certain activities, the therapist tried to maintain her sensitivity and attentive attitude to the state of the child, and facilitated the child's own motivation, enjoyment and attention. For details of intervention procedure, see the treatment manual (appendix 10.1).

4.7.1.3 Basic structure of music therapy and free play sessions

- 1) The sessions were divided into two parts - the first half (unstructured) and the second half (structured).
- 2) The physical environment was kept consistent throughout the trial period with all children. The same room was used for both conditions, and every effort was made to ensure that a safe and distraction-free environment. The comparable basic range of instruments for music therapy and toys for free play were consistent throughout the trial period.
- 3) Two built-in (hidden) cameras were used for recording the trials.
- 4) Greeting and good-bye rituals were carried on throughout the trial period.
- 5) The therapist prepared the child by announcing what to expect to happen in advance both at the beginning and the ending of each clinical trial.

4.7.1.4 Theoretical and philosophical perspectives of the structure of this clinical trial

Although it was an experimental research comparing the effect of two different media, play with toys and music therapy, the sessions were conducted as therapy sessions for child clients within the parameters of the research design. Clinical

experience, knowledge and philosophy were incorporated into formulating this specific treatment procedure so that the children could benefit from participating in these trials as much as if they were referred for improvisational music therapy within a clinical programme. Scheduling sessions for both conditions on the same day and time each week, and preparing for the ending of the sessions in advance were applied as basic principles of a psychodynamic approach, which the researcher has followed as a music therapist. Beginning the therapy session by accepting and addressing whatever the child brings in to the therapy is also part of improvisational music therapy principles and a psychodynamic approach, and it was well within the boundaries of this study to apply these principles without deviating from the protocol.

4.7.2 Procedure of music therapy versus free play session

The general procedures of the music therapy, and the free play sessions are introduced here, with the more detailed description of procedural process explicated in the treatment manual (appendix 10.1). As it is a procedural explanation as defined for the study, it is written in the present tense.

1) Greeting: When entering into the therapy room, the therapist greets the child, either verbally (mostly in free play sessions), or musically (only in music therapy sessions). In the first session, the therapist also explains when, and for how long they (the child and the therapist) are going to meet together for sessions in simple words, whether the child comprehends the language, or not.

2) Unstructured part (first 15 minutes): The main task for the therapist is to engage the child by following the child's lead. After the greeting ritual, the therapist should allow the child to explore the environment of each condition and carefully observe the child's focus of attention, interests and behavioural cues. If the child is interested in either toys, or instruments, the therapist should allow the child some time to explore the objects by himself, and then find her own way to join in with the child's activity, or if that is not possible, just simply to be with the child. This may be done by imitating, matching, reflecting, or verbally commenting on what the child does in that moment. The therapist should carefully monitor the child's reaction and react to the child accordingly. For example, if the child shows no interest in the objects in the room, the therapist may need to introduce some play materials to the child in order to motivate the child into interactive play. However, the therapist should be careful not to insist on something against the child's will. This first 15 minutes is characterized by the child taking charge of what goes on between the child and the therapist.

3) Structured part (last 15 minutes): In this part, the therapist begins to give

suggestions and directions to the child within the interest, focus of attention, and tolerance of the child. The therapist may structure the interaction by suggesting to the child to take turns, or through modeling. If the child shows signs of distress by throwing temper-tantrums, or by active (or passive) resistance, the therapist should allow the child to play on his own way for a while before initiating a new way of interaction. This second half is characterized by the therapist gently taking control of what goes on between the child and the therapist. If the child has been engaged in turn-taking activities from the first half till the second half, the therapist does not need to interrupt the interaction abruptly, but allow the interaction to flow on. When the turn-taking activity has finished, the therapist needs to introduce something new to the child either by modeling, or initiating another turn-taking activity.

4) Good-bye ritual: Every session is ended by a good-bye ritual. In music therapy, the good-bye ritual is prepared for by singing and playing a 'good-bye' song. In the free play session, it is carried out by sitting on the chair and verbalizing the good-bye. The therapist should always announce the ending of the session, and the next meeting in the good-bye ritual. It is also necessary to prepare the child for the approaching end of each of the 12 sessions in each condition by simply stating something like, "we've got 3 more sessions left". The therapist also needs to explain what is going to happen to the child – whether the child is going to have free play, or music therapy after the 12 sessions of the first condition has come to an end, or at the end of all the trials, and whether they are going to continue seeing each other for ongoing therapy sessions. These things need to be discussed with the parents prior to announcing it to the child.

In the early phase of the trials, the therapists found it difficult to be fully attentive to exactly when the first 15 minute period was completed due to the therapist's concentration on the on-going activity. Therefore, the researcher (or the research assistant) used a gently sounded Chinese horn after 15 minutes had passed to notify whoever was the therapist when to begin the structured part of the session.

4.7.3 Recording set-up

The focus for the filming was on the child's frontal upper part of the body including a clear view of the child's face. When child and therapist were together, the camera operator (research assistant) was instructed to capture both the therapist and the child (the mother and the child in home video). Sometimes, zoom-in and out of techniques were used according to the child's whereabouts and movement at that time.

4.7.4 Coding

Basic coding consisted of noting the frequency and duration of the occurrence of behaviours directly related to joint attention as described in this study, except Initiation of Interaction (II) by the therapist and Response to Initiation of Interaction (RII) by the subject. These two behaviours belonged to the social invitation category.

Joint attention behaviours as described in this music therapy study, are defined as three-way exchanges that involve another (the therapist), the child (self) and objects either in musical form (instrumental or vocal joint engagement), or in play. The following target behaviours are examples of those episodes and those behaviours are briefly defined and introduced here. For more details of coding guidelines, see appendix 10.16 for 'Music Therapy and Free Play Session Coding Guidelines'.

There are two categories of behaviour that are being examined in this study: Social invitation and joint attention behaviours. Social invitation yields frequency scores and joint attention behaviour yields both frequency and duration scores.

1) Social invitation (frequency scores only)

a) Initiation of interaction; This refers to the therapist's clear intentional behaviour to elicit responses from the child via modeling, making questions and suggestions, giving direction, introducing new way of playing etc in order to engage the child on the therapist's terms.

b) Responding to Initiation of Interaction; this refers to the child's behaviour in response to the therapist's initiation of interaction. There are three sub-categories as follows;

(a) Compliant Response; this refers to the child responding and complying with the therapist's demand(s).

(b) Non Compliant Response; this refers to the child responding in a non-compliant way to the therapist's demand by either passively, or actively rejecting the therapist's intentional initiation of interaction.

(c) No Response; this refers to the child showing no sign of awareness to the therapist's demand and continuing to do what s/he has been doing.

2) Joint attention (variable scoring involving both frequency and duration data)

a) Eye Contact: Both frequency & duration scores were collected for analysis.

This refers to an event where a child looks at the therapist while playing,

manipulating, holding, touching toys / instruments, or being engaged with the therapist in any way.

b) Joy: Both frequency and duration scores were collected for analysis.

Joy refers to the event when the child either smiles, or laughs during the interaction with the therapist.

c) Emotional Synchronicity: Both frequency & duration scores were collected for analysis

This refers to an event when the child and the therapist share a moment of emotional affect (happiness or sadness) while engaged with each other.

d) Musical Synchronicity: Both frequency & duration scores were collected for analysis.

This refers to the state where the child and the therapist are engaged in music making together with some congruence in two or more musical elements (rhythm, dynamic, melody, vocalization and gesture).

e) Initiation of Engagement: Only frequency scores were collected for analysis.

This refers to an event where the child spontaneously initiates interaction with the therapist, or initiates a change and expects the therapist to follow.

f) Turn-Taking: Both frequency and duration scores were collected for analysis.

This refers to an event involving a sequence of turns to play alternating between the child and the therapist.

g) Imitation: Only frequency scores were collected for analysis.

This refers to the state where the child spontaneously tries to follow the manner, style, or character of the therapist's playing, or what the therapist does while engaged in interaction.

4.7.5 Coding procedure

Sessions one, four, eight and twelve were selected for analysis in order to achieve a representative sample and examine change over time. As the sessions in both music therapy and free play were divided into two sections of an unstructured and a structured part, four minutes from the first half and four minutes from second half of the

session were selected for analysis. From the first unstructured half of the session (minutes 0-15), minutes four to seven were selected for analysis. The first three minutes were not selected from the first half as children usually need a little time to settle down in the therapeutic environment. The reason for selecting this particular time block was to see what could be a typical interaction between the therapist and the child in the unstructured part. During the second structured half of the session (minutes 16 to 30), minutes 19 to 22 were selected for analysis. In this case, the selection of this time span was to allow an adjustment by the child (and the therapist) to the structured activities, permitting again a period of settling into this type of interaction.

Preliminary coding took place from April, 2005 to September, 2005 by the researcher. During this time, the researcher did the coding of the target behaviours and realized that it was extremely time-consuming work that sometimes four minutes of analysis took four hours, and more than 20 times of twice slower viewing. During this period, the target behaviours were re-selected, some were discarded, re-defined and refined. Since it was heavily time-consuming work, the main coder has been the researcher. The researcher analyzed 160, four minute DVD clips (10.6 hours of footage) consisting of 80 DVD clips in the music condition and 80 in the play condition (for each child, four music therapy sessions and four for free play sessions were analyzed with two four minute clips from each session, one from the unstructured part, and one from the structured part). Inter-observer reliability analysis was undertaken by the research assistant, a music college graduate and candidate for music therapy postgraduate training in the U.K, who was trained for three months with samples of the DVD not included in the final selected sample for analysis. Subsequently, to analyze inter-observer reliability, 12 samples from the data were randomly selected (containing a total of 48 clips – 24 music therapy and 24 play) summing 30% of the total selected sample. The research assistant was blind to the session order of the DVD.

The basic coding consists of the DVD viewing and scoring on the coding sheet (appendix 10.17; session analysis coding sheet), which the researcher developed for the study. The following guidelines were developed to ensure consistency of coding:

Step 1: Watch each four minutes of DVD recording without stopping and notice the content of music therapy / free play session. When watching the music therapy session, it is advisable to note:

- If there is any musical synchronicity;
- Approximately when musical synchronicity begins and ends;
- How the play develops between the child and the therapist.

Step 2: Only focus on the four categories, Eye Contact, Joy, Emotional Synchronicity, Musical Synchronicity. The coder can stop at a specific point and go back and forth as many times as needed to record accurately when the target behaviours happen, and for how long. When there is musical synchronicity, it may be easier to record duration of musical synchronicity first, then eye contact, joy and finally emotional synchronicity. Eye contact and joy may need a half, or one fourth of the normal speed viewing for the precise coding.

Step 3: Only focus on Initiation of Interaction, Initiation of Engagement, Turn-Taking, and Imitation. The coder can stop the DVD as many times as necessary to ensure an accurate record of each target behaviour.

Step 4: Now the coder should review the specific moments when Musical Synchronicity occurred on the DVD and try to report the two most salient elements of musical interaction between the therapist and the child, making a note on the coding sheet.

4.8 Independent observers: role of research assistants

In this study, there were two independent observers as well as the researcher. For the analysis of MPIP, ESCS, and Session Analysis, the researcher trained first herself with several DVDs, and then trained the research assistants. The researcher did the coding and more than 30 % of MPIP recordings were selected and coded independently by the assistant for an inter-observer reliability check.

For the ESCS, the research assistant was the independent coder who did the entire ESCS coding, and more than 80 % were selected and coded by the researcher for an inter-observer reliability check.

For the analysis of treatment effects compared with the control, the coder was the researcher for the reasons mentioned before. 30% of DVDs were randomly selected and analyzed by the research assistant.

For the analysis, the research assistants were blind to the order of the DVDs. In addition to their role as independent observers, the research assistants helped in three areas; actual filming of the most sessions, the MPIP home video filming, and the administration of the ESCS.

4.9 Preparation of DVD data for analysis

Most data has been prepared on the DVD, except for the PDDBI. Each DVD can record approximately two hours of video data. DVD is the latest technology, and is more reliable, and durable than video. The MPIP and the first four months of the ESCS assessment and treatment trials were initially video recorded, and then transferred to DVD-RW. LG LCR- S 4800 is a VHS and DVD combi recorder that can transfer Video to DVD and vice versa. The MPIP was recorded by a Sony camcorder. The camcorder was then connected to the LG LCR-S 4800 through a stereo audio and visual wire, and transferred to DVD.

DVD – RW is the re-writeable DVD, which is convenient to save several video clips into one DVD. The MPIP and ESCS sessions were DVD – RW recorded. In order to use DVD – RW, the DVD –RW type has to go through an ‘Initialize’ process on the LG LCR – S 4800. Without the ‘Initialize’ process, one can not record anything on DVD –RW. In order to initialize the DVD – RW, one has to put the DVD on the LG LCR – S 4800, and then go to the initialize programme with the remote control. Initialize process takes approximately four minutes.

Early sessions of some children in clinical trials (music therapy and free play condition) were video recorded first, and transferred to the DVD –RW. Four minute Video clips for the convenience of the coding were also edited onto DVD-RW. The rest of the sessions were mostly DVD – R recorded except in a few cases. With DVD –R, the coder had to locate the appropriate time block and start coding as there was the whole 30 minutes session in the DVD –R recording. After recording the visual and auditory data on the DVD, the DVD has to go through a ‘finalize’ process on the LG LCR- S 4800. The finalize process takes approximately four minutes. Without the finalizing process, the DVD was only readable on the LG LCR-S4800 machine, but not in other DVD players. Most DVD –R type was readable on other DVD players, but DVD – RW were often not readable on other DVD players. However, in most computers with DVD combi players, both DVD – RW and –R type can be played. For reliable coding, however, the coder has to use LCR-S 4800 since other DVD players often do not have the function of slower speed viewing. Therefore, most of the codings were completed in the researcher’s own clinic using LCR-S 4800 machine and Panasonic 25 inches of TV monitor.

4.10 Data analysis

The research hypotheses generated the following range of questions for analysis that required statistical treatment of the data collected in the MPIP, PDDBI, and ESCS, as well as the frequency and duration data of session analysis from samples of the DVD recordings.

Data Analyses were divided into three parts;

- 1) Pre, in between and post session measurements; PDDBI, ESCS, MPIP
- 2) Analysis of subgroups on pre, in between, and post session analysis
- 3) Pooled results of session analysis

4.10.1 Pre, in between and post session measurements

There were three different types of pre/ post session measurements. The PDDBI is the informant based rating scale designed to assess the responsiveness to intervention in children with ASD. The ESCS is a video taped semi-structured observation measure. In this study, total ESCS (combined scores of joint attention and social interaction), joint attention and social interaction in the ESCS were selected to be presented. Both the ESCS and the PDDBI are the standardized measurement. The MPIP is also a video taped unstructured observation measure designed to assess the characteristics of the mothers – child free play at home situation.

A repeated measures analysis of variance (ANOVA) was used to look at significant interactions at the pre, ‘in between’, and post treatment periods. Correlations were undertaken to determine inter-observer reliability in the ESCS, MPIP and session analysis as well as levels of agreement between the parents and professionals in the PDDBI. Intraclass Correlation Coefficient (ICC) was used in all four measures (PDDBI, ESCS, MPIP, and session analysis). Using a repeated measures ANOVA, the graphs, or boxplots will be generated to show the changes over time. As a descriptive measure, effect sizes will be calculated to examine the magnitude of changes.

4.10.1.1 The PDDBI-Parents and Professionals

The analysis of the PDDBI data deals with the preliminary research question on whether the parents and professionals can also identify the behavioural changes concerning joint attention of the children with ASD. A repeated measures ANOVA was used to answer the following sub-questions generated for SPSS. The graphs will be generated to present the changes over time. Effect size will be calculated to identify whether it is significant.

1) What changes occurred comparing PDDBI scores of parents for subjects' behaviors' at pre-test and 'in between'.

2) What changes occurred comparing PDDBI scores of parents for subjects' behaviors' at pre-test and post-test.

3) What changes occurred comparing PDDBI scores of parents for subjects' behaviors' at pre-'in between' and post-test.

4) What changes occurred comparing PDDBI scores of professionals for subjects' behaviors' at pre-test and 'in between'.

5) What changes occurred comparing PDDBI scores of professionals for subjects' behaviors' at pre-test and post-test.

6) What changes occurred comparing PDDBI scores of professionals for subjects' behaviors' at pre-test 'in between' and post-test.

4.10.1.2 The ESCS-total, joint attention and social interaction

In this study, two out of three mutually exclusive broad categories (joint attention, social interaction, behavioural request) in ESCS were used. These two categories (joint attention and social interaction) consist of nine different, but related sub-scales as follows;

- 1) Initiation of joint attention lower behaviour
- 2) Initiation of joint attention higher behaviour
- 3) Responding to joint attention lower bid
- 4) Responding to joint attention higher bid
- 5) Initiation of social interaction turn-taking
- 6) Initiation of social interaction teasing
- 7) Initiation of social interaction song/tickle
- 8) Responding to social interaction lower bid
- 9) Responding to social interaction higher bid

Conceptually they all measure common variables that are indicators of early social communication skills (though with different functions in different areas). For an outcome study with a small number of participants, there is a need to reduce the number of outcome variables. Nine ESCS sub-scales belong to the two broadly defined categories – joint attention and social interaction.

Rationale for total score and subscales;

Peter Mundy, who designed and developed ESCS over the years, was contacted for clarification of the method for analysing scores. His response (8th March, 2006, personal correspondence) was as follows;

“Yes, you could combine RSI and ISI. You could combine joint attention and social interaction measures, however, you might want to check the correlations among any set of measures before combining them..... If you find that the scores are moderately to strongly correlate in your sample ($r > .40$ or $.45$ for example) then it may make sense to combine scale scores”.

To determine whether the nine ESCS sub-scales can be combined into a common scale, the internal consistency (Cronbach’s alpha) was calculated. Cronbach’s alpha indicates how well the items of a scale co-vary. Cronbach’s alpha can range from 0 to 1, and the closer to 1, the better (above 0.60 is seen as satisfactory, above 0.80 as good). Cronbach’s alpha for this 9-item scale (using only the first measurement) was 0.78 and can be considered good enough. It was similar for the second and third measurement, respectively. The inter-item correlation matrix also showed mostly convincing correlations (appendix 10.13).

Cronbach’s alpha for the two broad subscales was:

- 1) Joint attention: 0.81 (only the first time point; 0.60 for all time points combined),
- 2) Social interaction: 0.49 (only the first time point; 0.69 for all time points combined).

Therefore the joint attention subscale was even more reliable than the social interaction subscale.

Combination Method:

A problematic issue with the combined scores of the ESCS is that they vary in range. The manual for the ESCS provides no clear guidance about this issue. Some of the individual scales have a defined maximum score, others are open-ended. Therefore percentages cannot be used to standardise all the individual scales. A-Z standardisation would be too vulnerable with a small sample, and would make the score difficult to compare with other studies.

As the ESCS consists of only frequency data, the combined scales were therefore constructed by adding up the raw values. This may give more weights to those elements that vary most, but was used as the most transparent and clear solution possible for this scale. Therefore, it was processed with the total scale (simply summing up all items) and two broadly defined categories (joint attention and social interaction) to avoid the problem of excessive alpha error inflation when doing multiple tests.

In order to answer the following questions, a repeated measures ANOVA was conducted and an Intraclass Correlation Coefficient was used to determine inter-

observer reliability. Effect size was calculated to examine the magnitude of changes on the following parameters and between the following points:

1) What changes occurred comparing ESCS scores for the subjects' total scores at pre-test and 'in between'.

2) What changes occurred comparing ESCS scores for the subjects' total scores at pre and post test.

3) What changes occurred comparing ESCS scores for the subjects' total scores at 'in between and post test.

4) What changes occurred comparing ESCS scores for the subjects' joint attention scores at pre-test and 'in between'.

5) What changes occurred comparing ESCS scores for the subjects' joint attention scores at pre-test and post-test.

6) What changes occurred comparing ESCS scores for the subjects' joint attention scores at in-between and post-test.

7) What changes occurred comparing ESCS scores for the subjects' social interaction scores at pre-test and 'in between'.

8) What changes occurred comparing ESCS scores for the subjects' social interaction scores at pre-test and post-test.

9) What changes occurred comparing ESCS scores for the subjects' social interaction scores at 'in-between' and post-test.

10) Is there a difference in between the children who had music first, and those who had it the other way round (play first)?

4.10.1.3 The MPIP- MS, MA, MI, MP, CI, SC

A repeated measures ANOVA was used to answer the following six questions. An Intraclass Correlation Coefficient was used to determine inter-observer reliability.

1) What changes occurred comparing MPIP scores for the subjects' interaction on MS scores at pre-treatment, in-between treatment, and post treatment?

2) What changes occurred comparing MPIP scores for the subjects' interaction on MA scores at pre-treatment, in-between treatment, and post treatment?

3) What changes occurred comparing MPIP scores for the subjects' interaction on MP scores at pre-treatment, in-between treatment, and post treatment?

4) What changes occurred comparing MPIP scores for the subjects' interaction on MI scores at pre-treatment, in-between treatment, and post treatment?

5) What changes occurred comparing MPIP scores for the subjects' interaction on CI scores at pre-treatment, in-between treatment, and post treatment?

6) What changes occurred comparing MPIP scores for the subjects' interaction on SC scores at pre-treatment, in-between treatment, and post treatment?

4.10.2 Analysis of subgroups on pre, in between, post session analysis

Again, a repeated measures ANOVA were used to answer the following three questions. The results will be presented in tables and graphs.

1) Is there a difference in responsiveness shown in combined ESCS scores, PDDBI scores (parents and professionals) between verbal, relatively high-functioning autistic children (n = 1, 2, 5, 8, 9) and non-verbal, low functioning children (n = 3, 4, 6, 7, 10)?

2) Is there a difference in responsiveness shown in combined ESCS, PDDBI scores according to age group; three to four year old group (1, 2, 3, 6, 7, 8, 10), five to six year old group (4, 5, 9)?

3) Is there a difference in responsiveness shown in combined ESCS, PDDBI scores between mild to moderate autistic children (1, 2, 3, 8, 9, 10; CARS score between 30 to 37) and severely autistic children (4, 5, 6, 7; Above 37)?

4.10.3 Pooled result of session analysis

This section deals with analysis of the frequency and duration data from the video analysis of sampled four minute DVD cuts from sessions one, four, eight, twelve and the differences between two conditions (music vs. free play)

ICC was used to determine inter-observer reliability. A repeated measures ANOVA was used to answer the following questions. Before proceeding the analysis of the video data, the distributions of values was examined for all variables (appendix 10.18: Data screening for frequency and duration data from the video analysis). As would be expected with frequency and duration data, the data did not follow a normal distribution. Instead, the distribution of values resembled what is known as a Poisson distribution (Upton & Cook, 2002). The appropriate procedure for a repeated measures ANOVA based on a poison distribution is available in R (www.r-project.org, package MASS, function `glmmPQL`) and described in Venables & Ripley (2002, p. 297-298). This method is called "Generalized Linear Mixed Model with multivariate normal random effects, using Penalized Quasi-Likelihood". It is basically still a repeated measure ANOVA that is appropriate for frequency data and the like. All the analysis of

session data follows 'Penalized Quasi-Likelihood' where significant effects will be calculated and then depicted using boxplots.

1) What are the differences in frequency of Eye Contact over the four sessions when comparing:

unstructured music therapy vs. structured music therapy

unstructured free play vs. structured free play

structured music therapy vs. structured free play

unstructured music therapy vs. unstructured free play

structured music therapy vs. unstructured free play

unstructured music therapy vs. structured free play

2) What are the differences in duration in Eye Contact? Six comparisons as in question one.

3) What are the differences in Frequency in Joy? Six comparisons as in question one.

4) What are the differences in duration in Joy? Six comparisons as in question one.

5) What are the differences in frequency in Emotional Synchronicity? Six comparisons as in question one.

6) What are the differences in duration in Emotional Synchronicity? Six comparisons as in question one.

7) What are the differences in frequency in musical synchronicity? Six comparisons as in question one.

8) What are the differences in duration in musical Synchronicity? Six comparisons as in question one.

9) What are the differences in frequency in Initiation of Engagement (IE)? Six comparisons as in question one.

10) What are the differences in frequency in Turn-taking? Six comparisons as in question one.

11) What are the differences in duration in Turn-taking? Six comparisons as in question one.

12) What are the differences in frequency in Imitation? Six comparisons as in question one.

13) Is there a difference in frequencies in Initiation of Interaction by Therapist between first half (unstructured) and second half sessions (structured)?

14) What are the most salient musical elements and the least dominant element in musical synchronicity? Is there a difference in salient musical elements in the earlier (1st, 4th session) and later (8th, 12th) sessions?

15) When there is musical synchronicity occurring in free play session, what appeared to be the most salient musical elements in play condition?

16) What are the most used and selected instruments in music therapy, and the most used and selected toys in free play?

17) What is the total Responses to Initiation of Interaction (RII) in Pooled scores in terms of the ratio of CRF, NCF, and NRF respectively?

18) What is the total Response to Initiation of Interaction in total scores in both the music condition and in the play condition in terms of the ratio of CRF, NCF, and NRF respectively?

19) When we compare the 1st session with the 12th session, were there any changes in portion (ratio) in CRF within total scores of session 1 and session 12? Was there higher CRF ratio in the music than in the play condition?

4.11 The Research team

In this study, the author has been both the researcher, and the therapist who managed the research team and clinical trials. In order to carry out the research, many levels of close collaboration with others were needed; first, cooperation from the staff of the child & adolescent psychiatry at SNUH to select and refer the children; second, the parents' willing cooperation to bring the children each week for seven to eight months to the clinic; last, the collaboration of the therapists and research assistants. During the clinical trial period of approximately two years, two days of the week were solely reserved for the research trial in the clinic. All members of the research team also signed 'the research agreement form for research assistants/ therapist (appendix 10.4)' ensuring personal confidentiality of each case they were involved with.

At the beginning of this clinical trial, the author wished to collaborate with other music therapists, who were trained in different schools within improvisational music therapy tradition. The author would have liked to find out whether the treatment results could be generalized across different therapists from different schools, provided that we used a well-defined treatment manual to proceed the session. The author invited three music therapists in Seoul, two were trained at the New York Nordoff-Robbins Center and one trained in Italy. The two music therapists, who were N-R trained, turned

down the opportunity to participate in this study for personal reasons. The third music therapist, who was trained by Leslie Bunt on the course in Italy, was interested in this research and immediately joined in. She became the member of the Thursday Team. It was described as the Thursday Team since she only worked with the author on Thursday and that made the whole treatment schedule fixed to a Thursday for that time. For the children who participated on Thursday, the music therapy colleague and the researcher alternated the role of music therapist, and the therapist for free play sessions. Soon, the Wednesday group was formed. Although the music therapy colleague was a confident and able therapist both in music therapy and free play conditions, she found it very difficult to relate to, and manage a particular child, who dropped out in the middle of free play condition. It was due to the mother's obsessive and compulsive attitude and expectation towards her child and the therapist. From that experience, the idea of employing a play therapist was born and discussed. In time, there was a play therapist, who was interested in participating in this study. The play therapist became the member of the Wednesday Team. In the final stage of the clinical trial, one of the research assistants took the therapist's role in free play sessions with two autistic children. By the time he did free play sessions, he had been assisting the Wednesday Team for more than six months and therefore had observed and learned the procedure clearly. His work was supervised by the author throughout the 12 sessions. Therefore, all music therapy sessions were carried out by music therapists experienced with the autistic population. Free play sessions were carried out by four different people, the researcher, another music therapist, a play therapist and a research assistant (a music therapy graduate student, who was an experienced social worker with children with ASD). Prior to the beginning of clinical trial, all of them were informed about the structure of sessions both verbally, and through the treatment manual. The treatment manual was sent to them a month before the commencement of therapy. A week before the commencement of therapy, the researcher invited them to the clinic and did the role playing with them in order to make sure that they understood the procedure in the treatment manual. The team work was crucial and essential to carry out this clinical trial and it was a very intensive and focused treatment process for both music therapy, and free play conditions. Every session was closely observed by the mothers, the assistant, and the therapists. Every significant event in every session was recorded by minutes and seconds by the researcher in clinical recording independent from the present research. After the day's work, some crucial, interesting, or difficult issues and behaviours of the children were discussed among the colleagues. Through this clinical trial, we shared our idea, joy, hope, pain, and puzzlement in being the therapist with the autistic children.

4.12 Conclusion

This method was developed in order to undertake a primarily outcome based study into the effects of music therapy on joint attention, but with the important addition of the collection of qualitative data regarding the subject's behaviour and emotional attitude, as well as aspects concerning choices of instruments and musical elements inherent in the children's therapy process. Reflection on the role and attitude of the therapist will also be addressed to compliment the quantitative analysis of the outcome and effect. Clinical work and data collection underpinning this study was conducted between April, 2004 and February, 2006. The data was input into a personal computer and statistically treated using the analysis methods outlined in this chapter. These results will be reported in the following two chapters by presenting pooled data for the group results, and by presenting each subject as a case study.

CHAPTER 5

GROUP RESULTS

This Chapter presents the result of the analysis of the pooled data. The pooled results were treated statistically to determine whether any significant patterns emerged from the data.

In order to assist the reader to comprehend the results, the results will be presented in the same order of as the data analysis questions presented in Chapter 4.9. This includes the results of the data collected as pre, in between and post measures in the Pervasive Developmental Disorder Behavior Inventory (PDDBI), the Early Social Communication Scales (ESCS), the Mother Play Intervention Profile (MPIP), sub-group results as well as the pooled analysis of the two treatment conditions (music therapy vs. free play). The questions for analysis presented in Chapter 4 are derived from the hypothesis generated in Chapter 3.

My hypothesis was; the child's ability in joint attention will increase positively over time and musical attunement will play a role in improving joint attention behaviour of the child with ASD. Joint attention behaviour may be better in the music therapy condition than free play condition since music has long been noted to motivate children with ASD to participate in shared activities in music therapy literature. Musical and emotional synchronicity between the child and the therapist will increase over time during the joint musical engagement. The presence of emotional synchronicity may be greater in musical play than in free play as music has the potential to be an inherently emotive medium.

Primary and sub-research questions were:

1) Do children show observable and measurable changes in joint attention behaviour in response to improvisational music therapy? *Results will be presented from data analysis of pre, in between, and post measures of PDDBI, ESCS, and Session Analysis.*

(1.1) Are there any observable and measurable changes within one session when comparing the unstructured and structured approaches used in the session? *Frequency and duration data of observed behaviours from the session analysis will answer this question.*

(1.2) Are there changes in response over time when comparing the early to late period of music therapy? *PDDBI, ESCS and session analysis data will answer this question.*

(1.3) Are joint attention behaviours significantly better when compared with a baseline period of recorded observation before music therapy began? *ESCS, PDDBI, and session analysis data will answer this question.*

(1.4) Are joint attention behaviours better in music therapy when compared with free-play session? *ESCS, PDDBI, and session analysis data will answer this question.*

(1.5) Can parents and professionals also identify behavioural changes concerning joint attention? *The data of PDDBI will answer this question.*

2) Are there any observable musical features in improvisational music therapy that characterize the engagement and maintaining of joint attention of the child and the therapist both within and across cases?

(2.1) What is the main musical feature in engaging the child into mutual play? *Analysis of the salient musical elements in musical synchronicity will answer this question.*

(2.2) Does musical attunement (sensitive and responsive use of improvisation) appear to play a significant role in engaging the child into mutual play? *Musical Synchronicity measured in both conditions will be presented and described. The implication of musical synchronicity will be dealt in the discussion section as well.*

(2.3) Is there a developmental sequence in the mutual music making process that one can identify? *Some of statistical data from session analysis will be presented in this chapter. Some aspects of the clinical observational record of each session from each child will be presented and discussed in the discussion section as well.*

3) Treatment manual related questions; were the therapists able to follow the direction of the manual? Was it possible to apply the instruction of the manual to autistic children as it was described? Did it work? *The data of session analysis on Initiation of Interaction by the therapist and turn-taking will answer some aspects concerning the treatment protocol fidelity check.*

There are four types of data on which many different analyses were done: PDDBI scores; ESCS scores; MPIP scores and ratings; data from the analysis of samples of DVD recordings of treatment sessions. Since there is a lot of data from the analysis, raw scores of each measurement will predominantly be placed in the appendices. In general, pooled data of each measurement will be presented either in graphs or in boxplots with analyses done by repeated measures ANOVAs. Effect sizes will be calculated to examine whether the magnitude of changes was clinically meaningful. Group data presentation will follow this order;

- PDDBI results
- ESCS results
- MPIP results
- Subgroup results
- Session data results

5.1 Interpretation of results

5.1.1 Terms and abbreviations

There are many different terms and abbreviations used in this thesis. In order to avoid unnecessary replication of these terms and to clarify a clear structure and

nomenclature, the researcher now briefly re-states these terms and their abbreviations and definitions as they apply to the results of this chapter and the following Chapters (six and seven).

- *PDDBI* (Pervasive Developmental Disorder Behaviour Inventory) refers to the informant based rating scales for pervasive developmental disorders.
- *ESCS* (Early Social Communication Scales) refers to the video-taped semi-structured measure.
- *MPIP* (Mother Play Intervention Profile) refers to the video-taped unstructured measure of the mother and child free play at home.
- *ICC* (Intraclass Correlation Coefficient) refers to the measure of inter-observer reliability in this study.
- *A repeated measures ANOVA* (Analysis of Variance) refers to a type of statistical measure used in this study.
- *Pre, in between, post treatment measures* refer to the measurement of change over time. “Pre” is a measure taken immediately before the commencement of treatment, “in between” is a measure taken immediately after the completion of one treatment condition (either music therapy or free play), and then the “post” measure is that taken at completion of the second condition, which ends the completion of the clinical trial.

5.1.2 Interpretation of figures

The large proportion of results in Chapter 5 is presented through an explanation of figures and tables containing overall trends and results of repeated measures ANOVAs in group results. In all figures containing raw data and trend lines, a standardised format was used to help the reader to understand the responses between the conditions (music therapy vs. free play) across cases at different time points. There are two types of figures (graphs and boxplots) showing the results of group data.

The graphs are mainly used to illustrate the results of pre/ in between / post treatment measures. The scoring ranges of pooled scores of each measurement are depicted on the y-axis and three separate time points (pre, in between and post treatment period) are on the x-axis. The dotted line represents group 1, who had music therapy first and then free play later. The solid line represents group 2, who had free play first and then music therapy later. In the section for subgroup results, those lines may represent sub-groups.

The boxplots are mainly used to depict the results of session analysis data in both the music therapy and the free play conditions. The y-axis scores represent the scoring ranges of either frequency or duration data in the dependent variables whereas the x-axis represents independent variables. Each box represents the pooled results of the first to the third quartile (i.e. 25 to 75percentile). The bold line inside each box represents the median value. The lines extending above and below the boxes are called “whiskers” showing how far the values extend beyond the first and third quartile. Tiny balls above the whiskers are “outliers” that are too far outside to be included in the whisker. How much is “too far” is simply a convention in statistical analysis. In R, the default is considered 1.5 times the box size.

Tables report the results of a repeated measures ANOVA of corresponding variables for each data analysis. These facts will be briefly re-stated in the corresponding section to remind the readers how to make sense of these figures.

5.2 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

As explained in detail in the previous chapter, the PDDBI is an informant based rating scale used to answer the following research question; ‘Can parents and professionals also identify behavioural changes concerning joint attention?’. There are two sets of scores from the PDDBI – one from the parent and one from the teacher. Both parents and professionals completed the PDDBI at pre, in-between and post treatment periods. Therefore, the PDDBI is a method to assess the responsiveness to intervention in children with ASD, depending on the parents/professionals’ perception of the children’s development. The raw data of the PDDBI-social approach behaviour sub-scale is presented in appendix 10.9.

5.2.1 Levels of agreement in perception of behaviour between parents and professionals

An Intraclass Correlation Coefficient (ICC) was used to measure levels of agreement in perception of behaviour between parents and professionals. It needs to be noted that the comparison made here is strictly speaking not an inter-rater agreement, but it measures the comparison data (the behaviour seen by parents versus professionals) in different situations

Table 5.1 presents the differences in mean, and the correlations at pre-test, in between and post test between the parents and the professionals perceptions of behaviours on the PDDBI.

Table 5.1 Levels of agreement in perception of behaviour between parents and professionals

	Mean difference	Correlation
Pre-test	-15.7 *	0.19
In between test	-18.7 **	0.51
Post test	-10.7 *	0.67 *

Note. * $p < .05$; ** $p < .01$

As the children’s behaviours seen by parents versus professionals is based on their experience of the children in different situations, the level of agreement (correlation) appears to be very low. This result is consistent with the previous finding (Cohen et al, 2003) that the parent-teacher reliabilities were in general, not as high as teacher-teacher reliabilities. On average, parents scored significantly higher than professionals (see appendix 10.9). However, this table shows the correlation improved over time.

5.2.2 Pre, in between and post treatment results

The PDDBI results will be presented in graphs showing the changes over time. Effect size is calculated to identify whether the result is meaningful/of relevant size.

5.2.2.1 Professional-PDDBI

Figure 5.1 (the analysis of Professional-PDDBI by group) shows an analysis of the scores made by the professionals on the social approach subscale from section two of the PDDBI (y-axis) at the three separate time points (x-axis). The scores in figure 5.1 show the professionals perception of the children's behaviours concerning joint attention over time. Group 1 (dotted line) who had music therapy first, and free play after improved after music therapy, and to a slightly lesser degree after free play. Group 2 (solid line), who had free play first and music therapy later, improved slightly after free play, and to a larger degree after music therapy. The graph suggests that there was improvement over time in both groups. The improvement appears to be greater after music therapy than after free play.

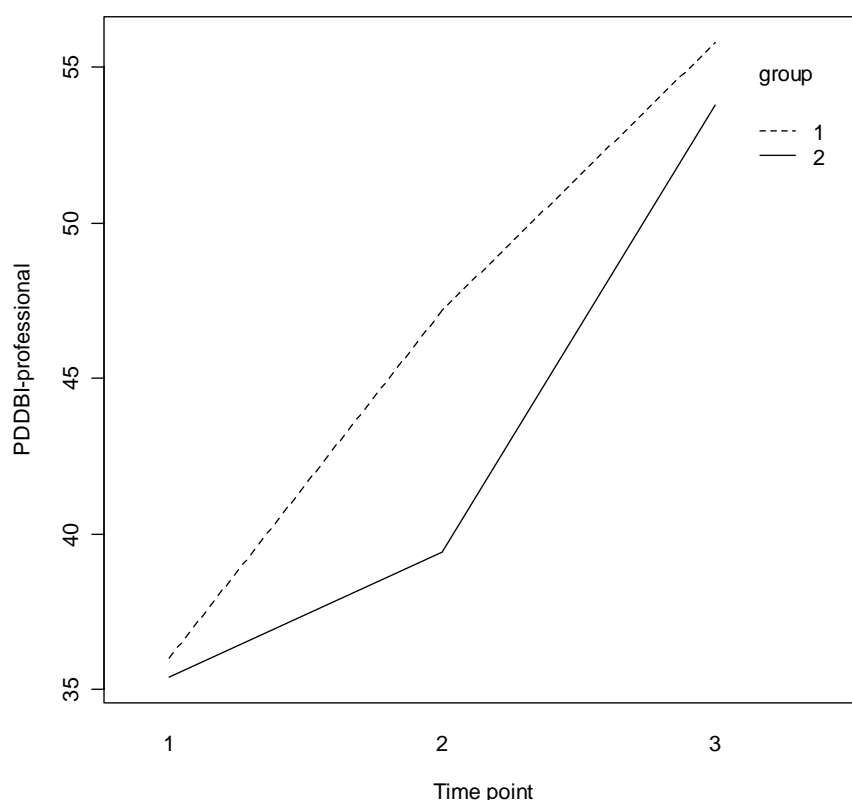


Figure 5.1 Professionals pooled scores of social approach behaviours – PDDBI

Table 5.2 presents the result of a repeated measures ANOVA used to assess whether these are significant. Time is a calculation of the effect over the twelve sessions, and group is a calculation of the differences between groups (across all time points). A further calculation is the interaction of time with the group in order to find out whether

the patterns of the lines differ significantly, and to determine whether there was a significant difference between the effects of the two treatment conditions.

Table 5.2 A repeated measures ANOVA of Professionals-PDDBI

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	16	19.82208	< .0001***
Group	1	8	0.10456	0.7547
Time : ¹ group	1	16	0.78099	0.4746

The results reveal that time is significant ($p < .0001$), but the other independent variables (the group and interaction of time with group) are not. Both groups improved over time, but no significant difference was found between groups or conditions. Effect sizes comparing scores after music therapy with after free play (ignoring the sequence) found a small effect ($d = .16$ with 95% Confidence Intervals ranging from 0.31-0.62). Recalculating the effect based on the change scores between data points (i.e. change during music therapy versus change during free play) yields an effect size of $d = .79$ (95% CI -0.14 – 1.71), a larger effect, but still not significant.

5.2.2.2 Parent-PDDBI

Figure 5.2 (the analysis of parent-PDDBI by group) shows an analysis of the scores made by the parents (the mothers) on the social approach subscale from section 2 of the PDDBI (y-axis) at the three separate time points (x-axis).

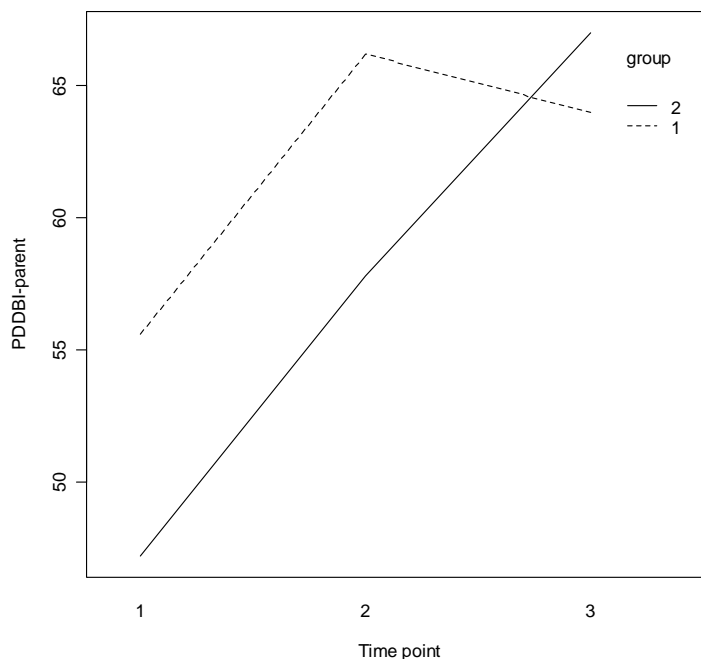


Figure 5.2 Parents pooled scores of social approach behaviours – PDDBI

¹ “.” means interaction.

The scores in figure 5.2 show the parents perception of the children's behaviours concerning joint attention over time. Group 1 (dotted line), who had music therapy first, and free play after, improved to a large degree after music therapy (approximately averaging 20 points), and then a slightly worsened after free play. Group 2 (solid line) who had free play therapy first and music therapy later, improved in both conditions and there was not much difference between the two conditions. The graph suggests that there is improvement over time in both groups. The improvement appears to be greater after music therapy, however, the results of parents-PDDBI was not consistent.

Table 5.3 presents the result of a repeated measures ANOVA used to assess whether these were significant. Interpretation and rationale for analyses are similar to the above professionals-PDDBI.

Table 5.3 A repeated measures ANOVA of parents-PDDBI

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	16	7.62334	0.0047**
Group	1	8	0.19306	0.6720
Time : group	2	16	1.53164	0.2463

The results reveal that time was significant ($p = .0047$), but the group and interaction of time with group were not. Both groups improved over time but no significant difference was found between groups or conditions. Effect sizes comparing scores after music therapy with after free play (ignoring the sequence) found a small effect ($d = .33$ with 95% Confidence Intervals ranging from 0.15-0.82). Recalculating the effect based on the change scores between data points (i.e. change during music therapy versus change during free play) yields an effect size of $d = .45$ (95% CI -0.65 – 1.55), a larger effect, but still not significant. This may well be due to small sample size, which resulted in low test power (i.e., low chance of detecting a significant effect even if the therapy was effective).

The pooled results of PDDBI demonstrated that both parents and professionals were able to identify behavioural changes of the children concerning joint attention. They recognized improvements in both condition that there was larger improvement after the music therapy than the free play. However, the difference between two conditions was not statistically significant.

5.3 Early Social Communication Scales (ESCS)

As explained previously, the ESCS is a video taped semi-structured observation measure. In this study, totalled ESCS scores (joint attention and social interaction combined scores), joint attention, social interaction scores respectively, and individual sub-scales in ESCS were selected to be presented in order to answer the main research question; “do children show observable and measurable changes in joint attention behaviour in response to improvisational music therapy?”

5.3.1 Inter-observer reliability of sub-scales in the ESCS

Table 5.4 presents the inter-observer reliability of sub-scales in ESCS at pre-treatment using Intraclass Correlation Coefficient (ICC) as the representative of entire ESCS inter-observer reliability.

Table 5.4 Inter-observer reliability of sub-scales in ESCS

Item	Agreement ICC
Initiation of Joint Attention, Low (IJAL)	0.89
Initiation of Joint Attention, High (IJAH)	0.71
Responding to Joint Attention, Low (RJAL)	0.96
Responding to Joint Attention, High (RJAH)	0.97
Initiation of Social Interaction, Turn-Taking (ISTT)	0.79
Initiation of Social Interaction, Song/Tickle (ISIS)	0.61
Initiation of Social Interaction, Teasing (ISTS)	NaN
Responding to Social Interaction, Low (RSIL)	0.44
Responding to Social Interacton, High (RSIH)	0.96

Most ICC results appeared to be quite good (above 0.61), or very good (up to 0.97) except for ISTS and RSIL. Regarding the Initiation of Social Interaction Teasing (ISTS) score, there was no variation in the scores. Therefore, ICC could not be calculated. This is because almost none of the children initiated teasing behaviour in a social interaction situation during the ESCS evaluation. Considering the characteristics of autism, the lack of occurrence of teasing behaviours in the children is not surprising. Although ICC could not be calculated, there was perfect agreement in low scores between the raters at all time points in ISTS. RSIL measures eye contact, act, or appeal (eye contact with act) after each song/tickle game was stopped. Sometimes, it was hard to distinguish whether the child responded simultaneously, just before, or after the song / tickle game since the song / tickle game had an on-going quality to it. Therefore, the agreement appeared to be low between the two observers.

5.3.2 ESCS-Total

Figure 5.3 shows the trend lines from an analysis of the totalled scores of ESCS (joint attention and social interaction scores combined); it portrays the frequency range of total ESCS scores (y-axis) at the three separate time points (x-axis). The raw data on which analyses of the ESCS was based, is presented in appendix 10.12.

The pattern looks quite similar to what we saw in the PDDBI scores from parents. The scores in figure 5.3 show the overall early social communication behaviours of the children (joint attention and social interaction) over time. Group 1 (dotted line) who had music therapy first, and free play second improved after music therapy, and then got worse after free play. Group 2 (solid line) who had free play therapy first and music therapy second, improved slightly after free play, and by a larger degree after music therapy. The graph suggests that there was improvement over time in both groups. Like the result of PDDBI, the improvement appears to be greater after music therapy than after free play.

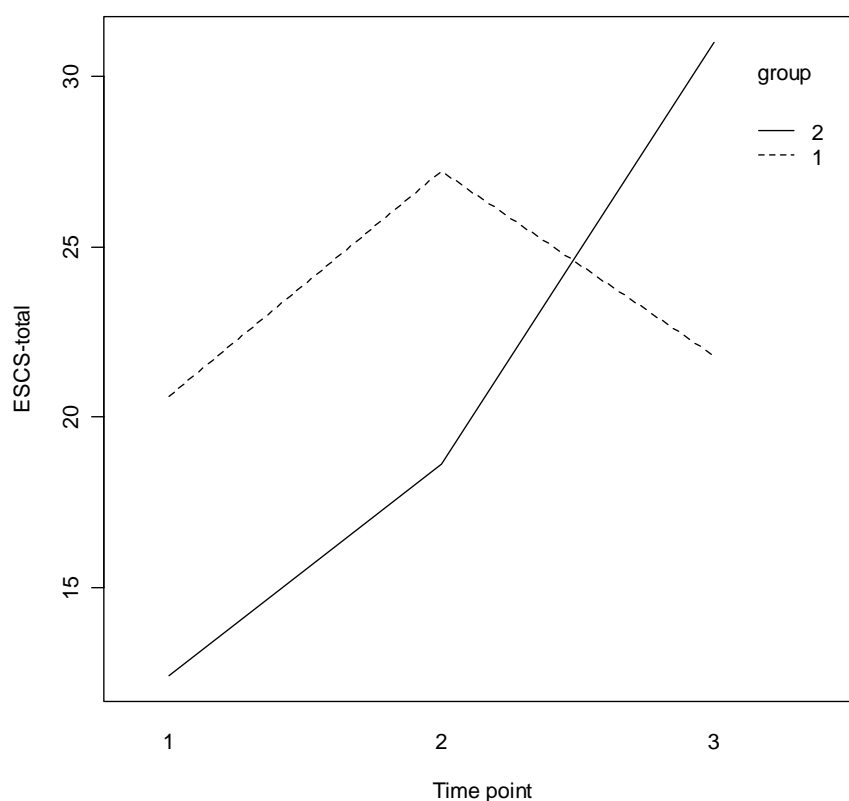


Figure 5.3 ESCS total scores (joint attention and social interaction scores combined)

Table 5.5 presents the result of a repeated measures ANOVA.

Table 5.5 A repeated measures ANOVA of ESCS total scores

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	16	5.103612	0.0193*
Group	1	8	0.085021	0.7780
Time : group	2	16	5.229160	0.0179*

The results from the ANOVA suggest that the interaction of time and group was significant ($p = .0179$). This suggests that music therapy was more effective than free play in addressing early social communication skills. The direction of the effect can be seen from the graph. Time alone was also significant ($p = .0193$). Effect sizes comparing scores after music therapy with after free play (ignoring the sequence) found a medium effect ($d = .57$ with 95% Confidence Intervals (CI) ranging from 0.23-0.92). Recalculating the effect based on the change scores between data points (i.e. change during music therapy versus change during free play) yields an effect size of $d = .95$ (95% CI ranging from 0.15 – 1.76), a larger significant effect. These two effect sizes were significant (at the $p < 0.05$ level) because the CI does not overlap zero.

5.3.3 Joint attention and social interaction scores

Here are the results for the two broad sub-scales; joint attention and social interaction. The pattern looks quite similar to what we saw in the totalled ESCS results.

The joint attention scores in figure 5.4 show combined scores of initiation of joint attention and responding to joint attention bid behaviours of the children over time. The social interaction scores in figure 5.4 shows combined scores of initiation of social interaction and responding to social interaction bid behaviours in children with ASD over time. In both graphs, group 1 (dotted line) who had music therapy first and free play second, improved after music therapy, and then got worse after free play. Group 2 (solid line) who had free play therapy first and music therapy second, improved slightly after free play, and to a larger degree after music therapy. However, the improvement was more pronounced in joint attention behaviours than social interaction behaviours. The graph suggests that there was improvement over time in both groups and the improvement appear to be greater after music therapy than after free play.

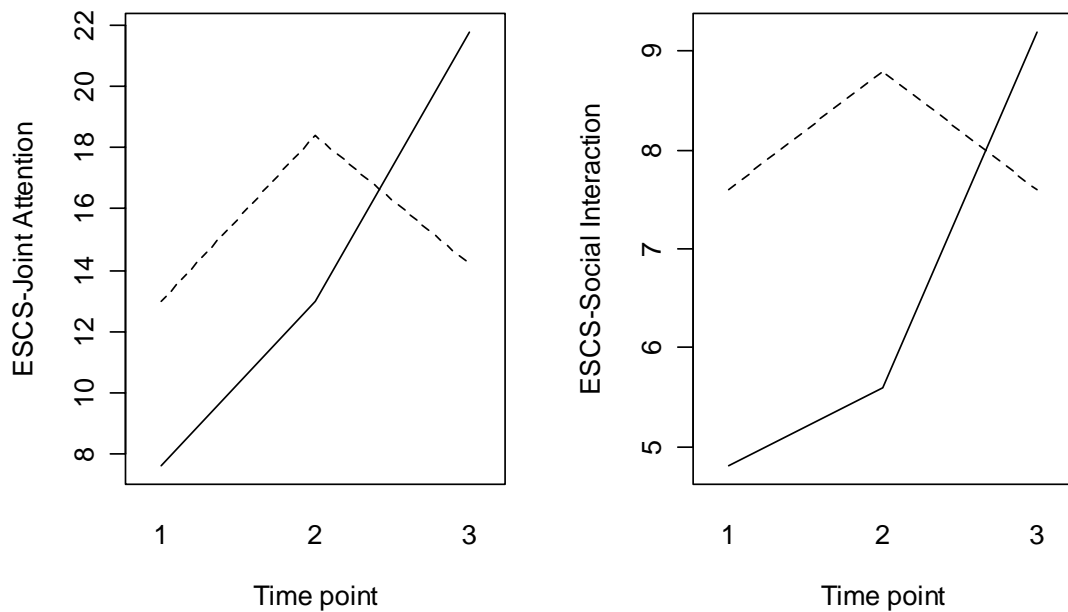


Figure 5.4 Pooled scores of joint attention and social interaction – ESCS

Tables 5.6 to 5.7 present the results of a repeated measure ANOVAs used to assess whether the magnitude of changes was significant.

Table 5.6 A repeated measures ANOVA of joint attention scores

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	16	6.758471	0.0075**
Group	1	8	0.031869	0.8628
Time : group	2	16	6.092285	0.0108*

Table 5.7 A repeated measures ANOVA of social interaction scores

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	16	0.911708	0.4217
Group	1	8	0.242122	0.6359
Time : group	2	16	1.332497	0.2916

The results of joint attention behaviours from the ANOVA suggest that the interaction of time and group was significant ($p = .0108$). This suggests that music therapy was different from free play in addressing joint attention skills. The direction of the effect can be seen from the graph. Time alone was also significant ($p = .0075$). However, the results of social interaction behaviours from the ANOVA suggest that none of independent variables (time, group, and the interaction of time and group) were significant. This suggests that although the graphs demonstrated more improvement after music therapy than after free play, the difference between the two conditions was not significant. Nevertheless, overall both graphs show that there were more improvements after the music condition than the free play condition.

5.3.4 Individual sub-scales of ESCS

Here, a graphical analysis of nine individual scales of ESCS is presented for the interest of looking at details of analysis results, but no further statistical tests was applied. Visually, the results of most graphs generally appear to indicate more improvement after the music therapy than the free play condition with a few exceptional cases (IJA-H, ISI-S).

- 1) IJA-L shows pooled data of Initiation of Joint Attention Lower behaviours ('eye contact' and 'alternating gaze between the tester and the toy') over time. The dotted line demonstrates that group 1 which had music therapy first and free play later, improved after the music therapy condition and got worse after the free play condition. The solid line shows that group 2 which had free play first and music therapy later, improved slightly after the free play condition, and then improved to a greater degree after the music therapy condition.
- 2) IJA-H shows pooled data of Initiation of Joint Attention Higher behaviours ('pointing' and 'showing') over time. The graph shows there was either no change over time, or the behaviours got worse. However, when we look at the y-axis, the changes in scores were little varied. There were hardly any changes in IJA-H.
- 3) RJA-L shows the pooled data of Responses to Joint Attention Lower bid ('following the proximal points using the picture book') over time. The dotted line reveals that group 1 improved after the music therapy condition slightly, and then got worse slightly after the free play condition. The solid line shows that group 2 got better after the free play condition and also got better after the music therapy condition, but to a lesser degree.

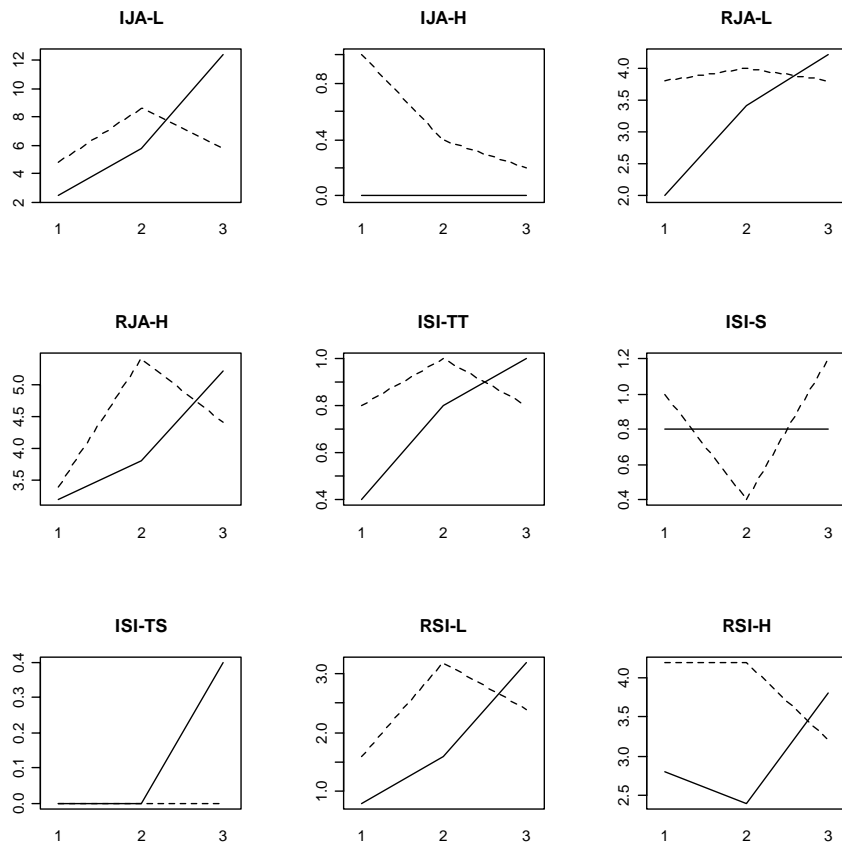


Figure 5.5: A graphical analysis of the nine individual scales – ESCS

- 4) RJA-H reports the pooled data of Responses to Joint Attention Higher bid ('following line of regard using the wall posters) over time. The dotted line shows that group 1 improved after the music therapy condition, and got worse after the free play condition. The solid line indicates that group 2 improved slightly after free play, and then the improvement was greater after the music therapy condition.
- 5) ISI-TT shows the pooled data of Initiation of Social Interaction, Turn-Taking behaviour ('initiation of turn-taking when the ball or car was presented') over time. The dotted line shows that group 1 improved slightly after the music therapy condition, and got slightly worse after the free play condition. The solid line shows that group 2 improved slightly more after free play and slightly less after the music therapy condition. However, when we looked at the scores on the y-axis, the improvement was very small.
- 6) ISI-S shows the pooled data of Initiation of Social Interaction, Song/tickle ('initiates song/tickle') over time. The dotted line shows that group 1 got slightly worse after music therapy, and then got better after the free play condition. The solid line shows that group 2 had no changes over time.

- 7) ISI-TS show the pooled data of Initiation of Social Interaction, Teasing ('initiates tease by engaging in a prohibited act while making eye contact with the tester') behaviours over time. The dotted line shows that group 1 shows no such behaviour over time. The solid line shows that group 2 showed no such behaviour after free play, and then showed little improvement after the music therapy condition.
- 8) RSI-L shows the pooled data of Responses to Social Interaction, Lower bid ('eye contact, act, and appeal after song/tickle game') over time. The dotted line shows that group 1 got slightly better after music therapy, and got slightly worse after the free play condition. The solid line shows that group 2 got slightly better after the free play condition, and more improvement was present after the music therapy condition.
- 9) RSI-H shows the pooled data of Responses to Social Interaction, Higher bid ('total turn-taking scores (ball, car) and total social invitation scores (hat, comb, glasses)') over time. The dotted line shows that group 1 did not show any changes of score after the music therapy condition, and got slightly worse after the free play condition. The solid line shows that group 2 got slightly worse after free play, and got better after the music therapy condition.

5.4 Mother Play Intervention Profile (MPIP)

The MPIP is a video taped unstructured observation measure designed to assess the characteristics of the mothers – child free play at home situation. Tables for repeated measures ANOVAs for six variables will be presented in this section. The raw data of the MPIP is presented in appendix 10.15.

5.4.1 Inter-observer reliability of sub-items in the MPIP

Table 5.8 presents inter-observer reliability scores of sub-items in MPIP and also describes the absolute agreement rate between two independent observers.

Table 5.8 Inter-observer reliability of sub-items in the MPIP

ITEM	Agreement ICC	Absolute agreement rate
The degree of the mother structuring the play (MS)	-.17	70%
The degree of the mother being active (MA)	0.94	90%
The degree of the mother initiating interaction (MI)	0.89	80%
The degree of the mother being passive (MP)	0.81	90%
The degree of the child initiating interaction (CI)	0.00	90 %
The degree of the mother offering social cue (SC)	0.89	80%

Four out of six scores of inter-observer reliability demonstrated high levels of agreement. For MS and CI, the ICCs indicated no meaningful correlation. However, there was 70~90 % perfect agreement of raw scores in both observers. The explanation for the 'bad' scores is that if one observer always gives the same rating while the other one varies, the correlation between the two becomes zero. This means statistically the

values of one observer are not useful in predicting the others. This was the case for CI. The child's initiation of interaction (CI) was very rare with the mother in the home situation. Therefore, this section was rated with "one" meaning 'almost none of the time' by the first observer. The second observer made almost the same rating, except in only one case. Therefore, ICC calculated zero correlation. In MPIP- MS ratings, there was a negative correlation: In almost all cases both observers say "four; most of the time", but when one says "three; quite often" the other says "four" and vice versa. The results of MPIP show how vulnerable small samples are.

5.4.2 Results of a repeated measures ANOVAs

Tables 5.9 to 5.14 present the result of a repeated measures ANOVA used to assess the changes over time in the six categories of MPIP.

Table 5.9 A repeated measures ANOVA of MS scores -MPIP

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Group	1	8	2.2273	0.1739
Time	2	16	2.2500	0.1377
Group : time	2	16	1.0000	0.3897

Table 5.10 A repeated measures ANOVA of MA scores -MPIP

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Group	1	8	0.10256	0.7570
Time	2	16	0.82540	0.4559
Group : time	2	16	3.87302	0.0425*

Table 5.11 A repeated measures ANOVA of MI scores -MPIP

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Group	1	8	0.0000	1.0000
Time	2	16	0.2500	0.7818
Group : time	2	16	1.7500	0.2054

Table 5.12 A repeated measures ANOVA of SC scores -MPIP

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Group	1	8	0.0769	0.7886
Time	2	16	0.5386	0.5938
Group : time	2	16	0.5386	0.5938

Table 5.13 A repeated measures ANOVA of MP scores -MPIP

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Group	1	8	0.20000	0.6666
Time	2	16	1.45454	0.2628
Group : time	2	16	1.45454	0.2628

Table 5.14 A repeated measures ANOVA of CI scores -MPIP

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Group	1	8	1.00001	0.3466
Time	2	16	1.00000	0.3897
Group : time	2	16	1.00000	0.3897

Most of the results (9, 11, 12, 13, and 14) reveal that time, group, and interaction of time with group was not significant. However the difference calculated for the activity of the mother when playing with her child (Table 5.10 (MA)) showed a significant interaction of time with group ($p = .0425$). Here is the graph:

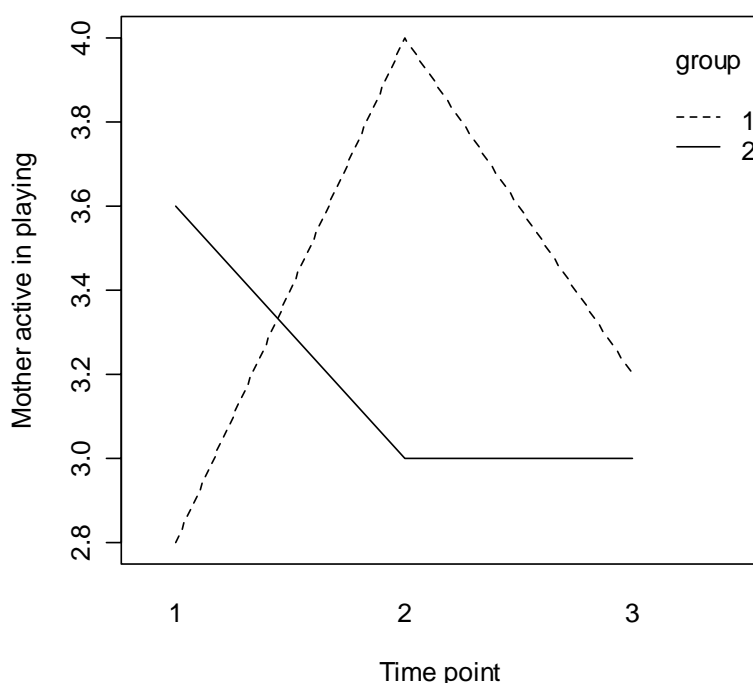
**Figure 5.6 The degree of mother being active at home situation – MPIP**

Figure 5.6 shows the pooled data regarding the degree of mother being active in play with the child at home over time. The dotted line demonstrates that group 1, which had music therapy first and free play later, became more active after the music therapy condition and became less active after the free play condition. The solid line shows that group 2, which had free play first and music therapy later, became less active after the free play condition, and stayed that level after the music therapy condition.

Although figure 5.6 showed some changes in mother's behaviour towards the child after free play at home situation, none of the other measures in MPIP indicated noticeable changes either in the mothers' or in the children's behaviour. This finding is congruent to the previous findings in mother-child interaction studies of autism, which will be explained more in detail in individual case studies in Chapter 6 and discussion Chapter 7.

5.5 Analysis of results by selected sub-groups of the Pervasive Developmental Disorder Behavior Inventory and the Early Social Communication Scales scores.

As children with ASD display huge variety and individuality across all ages and abilities, it is interesting and clinically relevant to find out whether language capacity, age and levels of severity in autism play a role in responsiveness to music therapy and free play interventions. Therefore, analyses of sub-groups were undertaken. A repeated measures ANOVA was used to find out whether the results are significant based on total ESCS, PDDBI scores for the following three areas;

- 1) verbal, relatively high-functioning versus non-verbal, low functioning children;
- 2) the younger versus the older children;
- 3) mild to moderate versus severe autism.

The results will be presented in graphs and tables. Any results here should be treated with caution as they involve very small numbers of the sample.

5.5.1 Verbal versus non-verbal children

Analysis of the subgroup based on the children's verbal ability and mental functioning has been undertaken. The children are divided into two sub-groups;

- 1) verbal, relatively high functioning children
- 2) non-verbal, relatively low functioning children

In addition group 1 (who had music therapy first and free play later), and group 2 (who had free play first and music therapy later) are compared within the subgroup analysis. Any results here should be treated with caution as they involve very small numbers of the sample. Table 5.15 summarises the demographics of these sub-group.

Table 5.15 The demographics of verbal and non-verbal children

	Verbal, relatively high-functioning	Non-verbal, relatively low-functioning
Group 1	3	2
Group 2	2	3

The graphs in figure 5.7 are going to show the professionals' and parents' PDDBI scores, and the totalled ESCS scores, which are broken down into the clinical sub-groups described (verbal, non-verbal) over time. The dotted line represents scores of the non-verbal subgroup, and the solid line represents scores of the verbal sub-group. The y-axis defines the scoring range by group, and the x-axis gives the three time points – pre, in-between and post- test.

Overall, these dotted and solid lines almost appear parallel to each other in most graphs in figure 5.7. The non-verbal children's performance level concerning joint attention behaviours in all measures appears to be lower (from pre-treatment to post treatment period) than the verbal children. The degree of non-verbal children's improvement seems to be parallel that of the verbal children. Group 1 (three verbal and two non-verbal children), who had music therapy first, and free play after, appears to improved more after music therapy in all three measures, and then either improved slightly, or regressed after free play. The results of Group 2 (two verbal and three non-

verbal children) who had free play first and music therapy later, demonstrate that the non-verbal children's improvement is more distinctively pronounced after music therapy than after free play, whereas the verbal children's level of improvement in both condition appeared to be quite similar or slightly better after the music therapy condition.

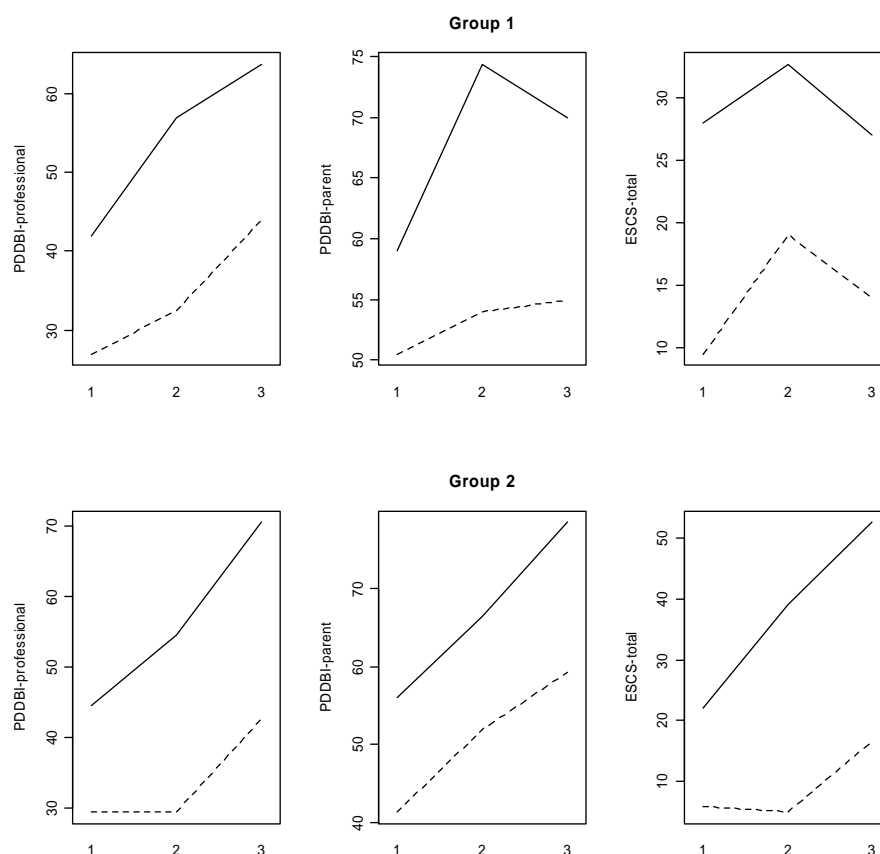


Figure 5.7 Verbal versus non-verbal children's responsiveness shown in PDDBI & total ESCS scores (dotted line = non-verbal; solid line = verbal)

The following tables 5.16 to 5.18 present the results of a repeated measures ANOVAs based on parents-PDDBI, professionals-PDDBI, and total ESCS scores in order to find out whether these results are significant.

The ANOVAs of PDDBI professionals and parents do not suggest that the level of verbal functioning has a significant impact on the responsiveness in children with ASD. However, the level of verbal capacity had a nearly significant value ($p = .0600$) in PDDBI professionals. The only significant effect of verbal ability appears to be in total ESCS result ($p = .0020$). This suggests that the more verbally able the child is, the higher scores in the ESCS and perhaps the better potential to develop joint attention skills. The three way interaction of time x group x verbal appear to have such a tendency in the ESCS, however at a non-significant level ($p = .0925$). Considering these results are derived from the small sample, the impact of verbal capacity on the responsiveness of the children may appear more significant given a larger sample.

Table 5.16 A repeated measures ANOVA of parents-PDDBI comparing verbal and non-verbal children

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	6.27865	0.0136*
Group	1	6	0.19539	0.6740
Verbal	1	6	2.09174	0.1982
Time : group	2	12	1.26148	0.3182
Time : verbal	2	12	0.30000	0.7462
Group : verbal	1	6	0.00499	0.9460
Time : group : verbal	2	12	0.28887	0.7542

Table 5.17 A repeated measures ANOVA of PDDBI-professionals comparing verbal and non-verbal children

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	18.96104	0.0002***
Group	1	6	0.14868	0.7131
Verbal	1	6	5.34894	0.0600
Time : group	2	12	0.74707	0.4946
Time : verbal	2	12	1.40539	0.2829
Group : verbal	1	6	0.02672	0.8755
Time : group : verbal	2	12	0.24709	0.7850

Table 5.18 A repeated measures ANOVA of ESCS total scores comparing verbal and non-verbal children

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	6.29792	0.0135*
Group	1	6	0.37697	0.5618
Verbal	1	6	26.88018	0.0020**
Time : group	2	12	6.45285	0.0125**
Time : verbal	2	12	0.94998	0.4140
Group : verbal	1	6	2.59040	0.1586
Time : group : verbal	2	12	2.92212	0.0925

Here are the graphs of verbal and non-verbal comparison on total ESCS scores. In these graphs, the dotted line is group 1 that had music therapy first and free play later, and the solid line is group 2 that had free play first and music therapy later. The graphs in figure 5.8 show marked improvements in the music therapy condition in both verbal and non-verbal children. For group 1, the patterns over time appeared to be similar for both verbal and non-verbal children (improvement after music therapy, and regression after free play). For the verbal children in group 2, there were little difference of responsiveness in music therapy and free play condition, whereas non-verbal children's performance were worse after the free play condition and markedly better after the music therapy condition. One can conclude from the graphs that the overall range of improvement shown in totalled ESCS was greater in verbal children than non-verbal children. However, non-verbal children's responsiveness were consistently and markedly better after music therapy, and consistently got worse after free play.

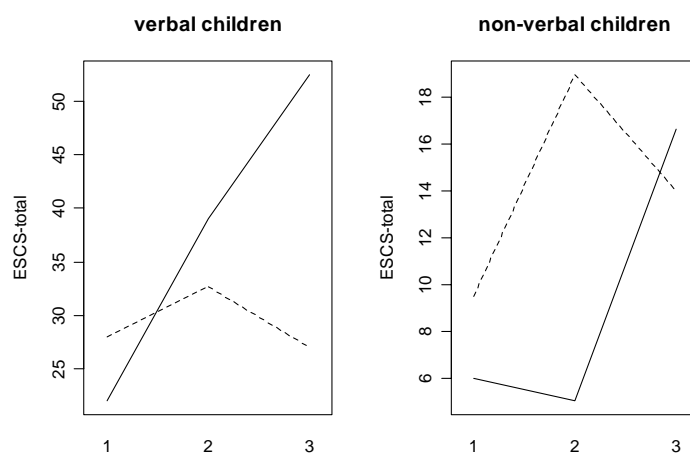


Figure 5.8 Verbal and non-verbal comparison graphs on total ESCS scores (the dotted line = group 1; the solid line = group 2)

5.5.2 The younger versus the older children

As briefly described in Chapter 4, based on autism brain research, Mundy and Crowson (1997) argued that the intervention that was done for children aged between two and four years may be the most beneficial to the children with autism. Also, the developmental benefits of early intensive interventions are reported by many experts in autism. Therefore, analysis of the subgroup based on the children's age has been undertaken. The children are divided into two sub-groups;

- 1) younger group, age between three and four
- 2) older group, age between five and six

In addition group 1 (who had music therapy first and free play later), and group 2 (who had free play first and music therapy later) are also compared within the subgroup. Any results here should be treated with caution as they involve very small numbers of the sample. Table 5.19 summarises the demographics of the sub-group.

Table 5.19 The demographics of the younger vs. the older children

	Younger, three and four year old children	Older, five and six year old children
Group 1	3	2
Group 2	4	1

The following graphs in figure 5.9 are going to show the professionals and parents PDDBI scores, and the totalled ESCS scores broken down into the clinical sub-groups described (younger and older) by group over time. The dotted line represents scores of the younger subgroup, and the solid line represents scores of the older subgroup. The y-axis defines the scoring range by group, and the x-axis gives the three time points – pre, in-between and post- treatment.

The graphs of the younger children in Group 1, who had music therapy first and free play later, showed marked improvement in all three measures (PDDBI

professionals and parents, and totalled ESCS scores) after the music therapy, and then showed either slight improvement, or even regression after the free play condition.

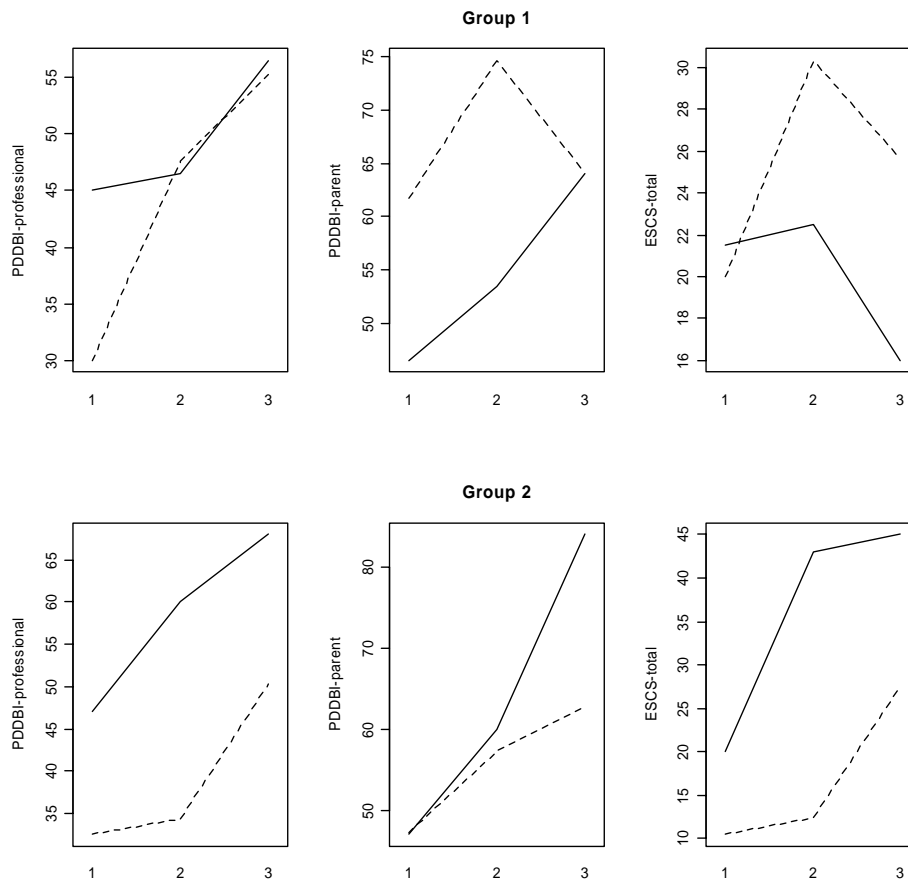


Figure 5.9 The younger and the older children's responsiveness shown in PDDBI & total ESCS (dotted line = younger; solid line = older)

The PDDBI graphs of the older children in group 1 showed slight improvement after the music therapy condition and slightly more improvement after the free play condition whereas the ESCS graph of the older children showed slight improvement after the music therapy condition and marked regression after the free play condition. Here the findings from the PDDBI and ESCS offered conflicting results. One has to note that the PDDBI is the rating scales based on adults' perception of the children's behaviour whereas the ESCS is the semi-structured test scores based on the children's performance concerning early social communication skills.

The graphs of younger children in group 2, demonstrate marked improvement after the music therapy condition except PDDBI-parents where the improvements after free play were slightly better than after music therapy condition. The graphs of the older child (only one) in group 2, shows more improvement after the free play condition in professionals-PDDBI and totalled ESCS scores whereas parents-PDDBI scores reported similar range of improvement in both conditions. In general, the result of graphs seems to show more marked improvement after the music therapy condition in younger children whereas the graphs of the older children show conflicting information.

However, we cannot generalize these results since the sub-groups do not involve equal number of matched children, nor it is a big enough sample.

The following tables are the result of a repeated measures ANOVA of PDDBI professionals and parents and totalled ESCS.

Table 5.20 A repeated measures ANOVA of parents-PDDBI comparing younger and older children

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	10.28728	0.0025**
Group	1	6	0.16145	0.7017
Age	1	6	0.10261	0.7596
Time : group	2	12	2.06687	0.1693
Time : age	2	12	4.59979	0.0329*
Group : age	1	6	0.58761	0.4724
Time : group : age	2	12	0.19577	0.8248

Table 5.21 A repeated measures ANOVA of professionals-PDDBI comparing younger and older children

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	21.77905	0.0001***
Group	1	6	0.09152	0.7725
Age	1	6	0.70183	0.4343
Time : group	2	12	0.85810	0.4484
Time : age	2	12	0.62242	0.5531
Group : age	1	6	0.30038	0.6034
Time : group : age	2	12	2.16739	0.1572

Table 5.22 A repeated measures ANOVA of ESCS total comparing younger and older children

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	5.768098	0.0176*
Group	1	6	0.081467	0.7849
Age	1	6	0.202606	0.6684
Time : group	2	12	5.909993	0.0163*
Time : age	2	12	0.456047	0.6443
Group : age	1	6	1.462945	0.2720
Time : group : age	2	12	2.585536	0.1165

There is no significant three-way interaction (time x group x age) here. Age did not appear to have an influence on the responsiveness to the music therapy versus the free play condition. There is a significant two-way interaction of time x age ($p = .0329$) in PDDBI-parent. However that means only that these scores develop differently over time in children of different ages; it does not show anything about the effect of music therapy versus the free play condition.

5.5.3 The mild to moderate versus severe autism based on CARS scores

Analysis of the subgroup based on the children’s severity of autism has been undertaken based on the children’s CARS scores. The children are divided into two sub-groups;

- 1) mild to moderate autism, CARS score between 30 ~ 37
- 2) severe autism, CARS score above 37

In addition group 1 (music therapy first and free play later) and group 2 (free play first and music therapy later) forms part of the comparison.

Any results here should be treated with caution as they involve very small numbers of the sample. Table 5.23 summarises the demographics of these sub-groups.

Table 5.23 The demographics of mild to moderate vs. severe autism

	Children with mild to moderate autism	Children with severe autism
Group 1	3	2
Group 2	3	2

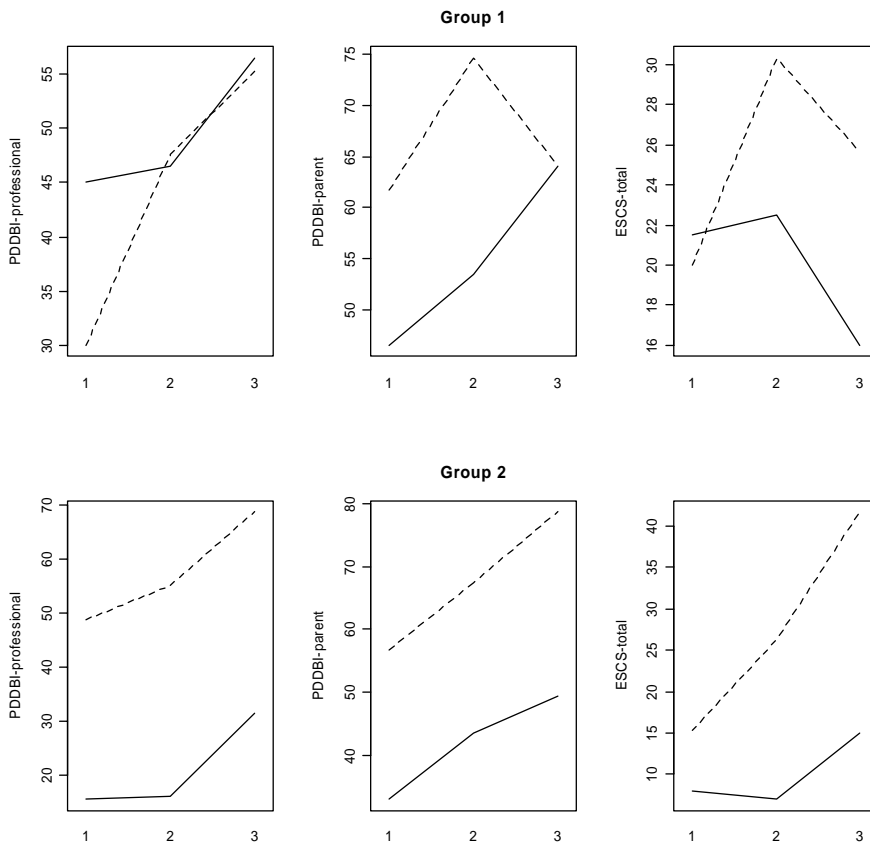


Figure 5.10 Children’s responsiveness with mild to moderate versus severe autism shown in the PDDBI & total ESCS (dotted line = mild to moderately autistic, solid line = severely autistic children)

The graphs in figure 5.10 are going to show the professionals and parents PDDBI scores and the totalled ESCS scores broken down into the clinical sub-groups described (mild to moderate, severe autism) by group over time. The dotted line represents scores of the mild to moderate autism subgroup, and the solid line represents scores of the severe autism sub-group. The y-axis defines the scoring range by group, and the x-axis gives the three time points – pre, in-between and post- test.

The graphs of children with mild to moderate autism in Group 1 (music therapy first, and free play later) show marked improvement after the music therapy condition in all three measures (PDDBI professionals and parents, and totalled ESCS scores), and then showed either slight improvement, or even regression after the free play condition. The PDDBI-professionals and parents graph of children with severe autism in group 1 showed slight improvement after the music therapy condition and slightly more or marked improvement after the free play condition, whereas the the ESCS graphs showed slight improvement after the music therapy condition and marked regression after the free play condition. Here the results of PDDBI and ESCS show conflicting information. One has to note that PDDBI is the rating scales based on adults' perception of the children's behaviour whereas the ESCS is the semi-structured test scores based on the children's performance concerning early social communication skills.

The graphs of children with mild to moderate autism in group 2, demonstrate more or less equal, or slightly more improvement in music therapy than free play. The graphs of children with severe autism show either no improvement or slight improvement after the free play condition and generally more pronounced improvement after the music therapy condition except PDDBI-parents where the difference between music therapy and free play was not significant.

In general, the result of graphs suggests the level of responsiveness were greater in mild to moderately autistic children and the influence of music therapy seems more pronounced than in free play. However, we cannot generalize these results since the sub-groups do not involve equal numbers of matched children, nor is it a big enough sample.

The following tables are the result of a repeated measures ANOVA of PDDBI professionals and parents and totalled ESCS.

Table 5.24 A repeated measures ANOVA of parents-PDDBI comparing moderate and severe levels of autism

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	7.86698	.0066**
Group	1	6	0.25755	0.6299
Severity	1	6	4.14453	0.0880
Time : group	2	12	1.58060	0.2659
Time : Severity	2	12	0.55776	0.5866
Group : age	1	6	0.52802	0.4948
Time : group : severity	2	12	1.69792	0.2242

Table 5.25 A repeated measures ANOVA of professionals-PDDBI comparing moderate and severe levels of autism

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	20.48145	0.0001***
Group	1	6	0.26708	0.6238
Severity	1	6	5.27365	0.0614
Time : group	2	12	0.80697	0.4690
Time : severity	2	12	1.81489	0.2048
Group : severity	1	6	9.16127	0.0232*
Time:group:severity	2	12	0.45123	0.6472

Table 5.26 A repeated measures ANOVA of ESCS total comparing moderate and severe levels of autism

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Time	2	12	6.361219	0.0131*
Group	1	6	0.087810	0.7770
Severity	1	6	1.753939	0.2336
Time : group	2	12	6.517705	0.0121*
Time : severity	2	12	3.708678	0.0557
Group : severity	1	6	0.508538	0.5026
Time :group:severity	2	12	0.262632	0.7733

There is no significant three-way interaction found here. Group x severity in PDDBI-professionals appears to be significant ($p = .0232$). In PDDBI scores, the results approached significance in severity (parents, $p = .0880$; professionals, $p = .0638$). In the ESCS total, the result approached significance in time x severity ($p = .0557$). If given enough numbers in the sample, the significance may emerge when comparing the level of severity in autism. However, these results do not distinguish music therapy versus free play effects.

The sub-groups presented in this section have even smaller numbers with unevenly matched children. Therefore any results here should be treated with caution. However, it would be interesting to find out more of these sub-group effects on the responsiveness of improvisational music therapy intervention since this will show a clearer direction to clinical applicability. The following section will show session results in the music therapy and the free play conditions.

5.6 Session analysis

The analysis of dependent variables (target behaviours) in this study consists of analysing frequency and duration data from the DVD analysis of sampled four minute DVD cuts (four minutes from the unstructured first half, and another four minutes from the structured second half) from sessions 1, 4, 8, and 12 in both conditions (music therapy vs. free play). The raw data of session analysis is presented in appendix 10.19.

Analysis of target behaviours was done to answer the primary research questions one, two, and three, and the sub-questions (1.1; 1.2; 1.3; 1.4; 1.5; 2.2; 2.3). In order to answer these questions, 19 statistical analyses questions were generated and introduced in Chapter 4, data analysis section (see 4.10.3). As stated before in Chapter 4.10.3, the distribution of values of session data resembled what is known as a Poisson distribution (Upton & Cook, 2002). Therefore, the appropriate procedure for a repeated measures ANOVA based on a poisson distribution was sought and found. This method is called “Generalized Linear Mixed Model with multivariate normal random effects, using Penalized Quasi-Likelihood”. All analysis of session data therefore follows this model using ‘Penalized Quasi-Likelihood’ which is basically a repeated measures ANOVA. Using a repeated measures ANOVA, significant effects were calculated and will be depicted using boxplots and tables. Intraclass Correlation Coefficients (ICC) was used to determine inter-observer reliability.

5.6.1 Inter-observer reliability of dependent variables in session analysis

As explained in Chapter 4 (4.7.5 section), in order to establish inter-observer reliability, 30 % of total selected samples were randomly selected and used (twelve samples in each condition, containing a total of 48 DVD clips – 24 music therapy and 24 free play).

Table 5.27 presents inter-observer reliability of dependent variables of session analysis data using agreement ICC.

Table 5.27 Inter-observer reliability of dependent variables in session analysis

Variable	Agreement ICC
Eye Contact Frequency (ECF)	0.96
Joy Frequency (JOYF)	0.91
Emotional Synchronicity Frequency (ESF)	0.90
Musical Synchronicity Frequency (MSF)	0.96
Initiation of Engagement Frequency by the Child (IEF)	0.93
Turn-Taking Frequency (TTF)	0.94
Imitation Frequency (IMF)	0.69
Initiation of Interaction Frequency by the therapist (IIF)	0.86
Eye Contact Duration (ECD)	0.96
Joy Duration (JOYD)	0.98
Emotional Synchronicity Duration (ESD)	0.92
Musical Synchronicity Duration (MSD)	0.98
Turn-Taking Duration (TTD)	0.92

The results demonstrated very high inter-observer reliability on almost all items of the dependent variables of the session analysis. Only IMF shows a low level of agreement between two independent observers. IMF had five sub-categories; verbal, vocal, musical, gestural, delayed response. As children’s behaviours occur quickly and briefly with multi-faceted aspects at times, the agreement between two observers appeared to be lower than in the other categories.

5.6.2 Dependent variables concerning joint attention behaviours

Dependent variables were analyzed using “Generalized Linear Mixed Model with multivariate normal random effects, using Penalized Quasi-Likelihood” that is

basically a repeated measures ANOVA. All the following analyses follow this procedure, and where significant effects are found, these are then depicted using boxplots and tables. Questions for analysis posed here for each dependent variable were concerned with comparing the two conditions (music therapy vs. free play), the structured and unstructured parts of sessions, and the differences between the sampled sessions over time.

5.6.2.1 Eye contact frequency

The focus for analysis for eye contact frequency was; what are the difference in frequency of eye contact over the four sessions where comparing: 1) music therapy unstructured vs. music therapy structured; 2) free play unstructured vs. free play structured; 3) music therapy structured vs. free play structured; 4) music therapy unstructured vs. free play unstructured; 5) music therapy structured vs. free play unstructured; 6) music therapy unstructured vs. free play structured. As explained above, the analysis question posed here for eye contact frequency was concerned with comparing the two conditions, the structured and unstructured parts of the sessions, and the session number. Therefore, the independent variables are:

- 1) condition – music therapy vs. free play;
- 2) session part – structured vs. unstructured;
- 3) session – 1st, 4th, 8th and 12th session (note that we are not restricting this to a linear change, but are looking at whether the sessions differ in any way);
- 4) Interaction of all variables (i.e., condition x² session part; condition x session; session part x session; condition x session part x session).

This will not be explained again in order to avoid repetition of the same information throughout the reports of session analysis.

Table 5.28 presents the result of a repeated measures ANOVA used to assess whether these variables were significant.

Table 5.28 A repeated measures ANOVA of eye contact frequency

Variable	Numerator Degrees Freedom	Denominator of degrees of freedom	F-value	p-value
Condition	1	135	57.15311	<.0001***
Session part	1	135	2.43243	0.1212
Session	3	135	1.66386	0.1778
Condition : session part	1	135	2.33341	0.1290
Condition : session	3	135	0.88314	0.4517
Session part : session	3	135	0.11228	0.9528
Condition : session part : session	3	135	0.16590	0.9192

Table 5.28 shows that a significant effect ($p < .0001$) was found comparing the music therapy condition with free play. This result answers the research question; ‘are joint attention behaviours better in music therapy when compared with free play?’. The

² “x” means interaction.

answer is shown in figure 5.11. None of the other independent variables reached significance. Inter-observer reliability reached 0.96 agreements in eye contact frequency data; therefore, it was very reliable data. Figure 5.11 shows this result in a boxplot.

The y-axis scores represent the scoring range in frequencies of eye contacts made by the whole group in the selected samples from the selected sessions, charted in the boxplots by condition. The boxes represent the results of the first to the third quartile (i.e. 25~ 75percentile). The bold line in the box represents median value. The lines extending above and below the boxes are called “whiskers” showing how far the values extend. Tiny balls above the whiskers are “outliers” that are far outside to be included in the whisker. This detailed explanation of boxplots will not be repeated in other variables.

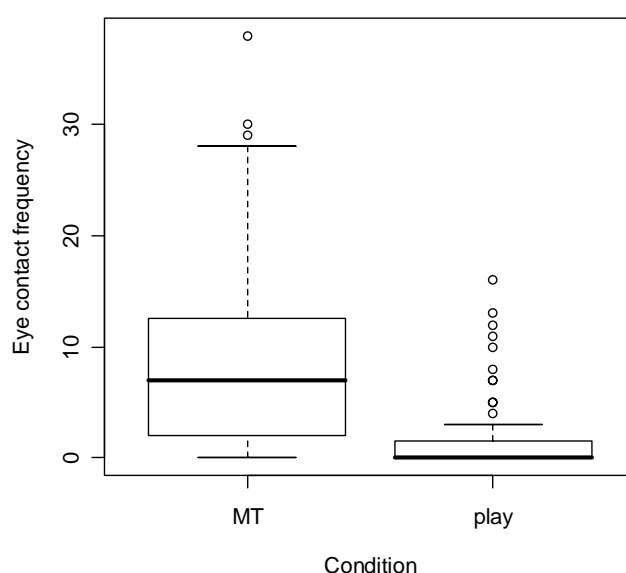


Figure 5.11: Eye contact frequency

The boxplot shows more spontaneous eye contact frequencies in the music therapy condition than the free play condition where the median value of eye contact was zero. Therefore, this result answers the research question of whether joint attention behaviour is significantly better in the music therapy when compared with the free play condition, but does not directly answer other questions. The following data will present eye contact duration.

5.6.2.2 Eye contact duration

The analysis of eye contact duration was conducted using a repeated measures ANOVA to find out whether variables and interactions of variables were significant. Table 5.29 shows the results.

Table 5.29 shows that a significant effect ($p < .0001$) was found comparing the music therapy condition with free play. None of the other independent variables reached significance. Inter-observer reliability reached 0.96 agreements in eye contact duration; therefore, it was very reliable data.

Table 5.29 A repeated measures ANOVA of eye contact duration

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	51.45844	<.0001***
Session part	1	135	0.65496	0.4198
Session	3	135	1.95129	0.1243
Condition : session part	1	135	0.55384	0.4580
Condition : session	3	135	0.05705	0.9820
Session part : session	3	135	0.60202	0.6148
Condition : session part : session	3	135	1.25087	0.2939

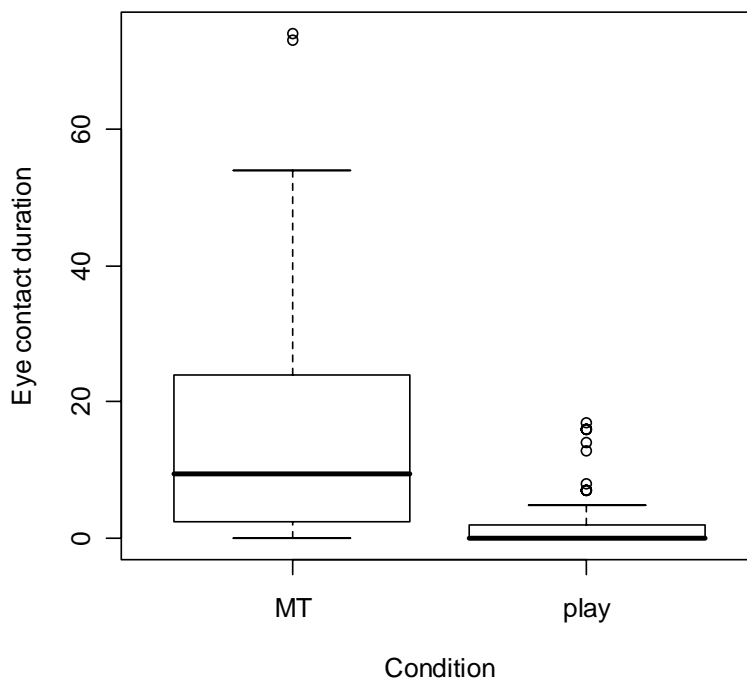
**Figure 5.12: Eye contact duration**

Figure 5.12 shows this result in a boxplot. The portrayal in the boxplot is similar to Figure 5.11 (eye contact frequency). Spontaneous eye contact between the therapist and the child occurred for a longer period of time in the music therapy condition than in the free play condition where the median value for eye contact duration is zero. The median value of eye contact duration is located below the middle of the box. This means that there were lengthier durations of eye contact happening than the median value.

The over all impression of this boxplot shows that the effect of music therapy is much better at improving the visual joint attention behaviours of the children with ASD than the free play condition. The implication of this finding will be fully discussed in the discussion chapter.

5.6.2.3 Joy frequency

Joy refers to events when the child either smiles (facial expression only), or laughs (facial expression with vocal sound) during the interaction with the therapist. The event of joy does not necessarily belong to the working definition of joint attention behaviours in this study. Joy may appear regardless of the existence of joint attention between the child and the therapist. Nevertheless, as the clinical implication of the occurrence of joy in certain conditions (either music therapy or free play) is significant as the motivational factor for the child to join in shared activities with the therapist, the researcher decided to measure the event of joy during the interaction between the child and the therapist in connection with emotional synchronicity.

The following table 5.30 reports the results from a repeated measures ANOVA of the frequency of joy events.

Table 5.30 A repeated measures ANOVA of joy frequency

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	24.264070	<.0001***
Session part	1	135	7.069921	0.0088**
Session	3	135	4.401111	0.0055**
Condition : session part	1	135	1.140557	0.2874
Condition : session	3	135	1.740580	0.1617
Session part : session	3	135	0.417789	0.7405
Condition : session part : session	3	135	1.293396	0.2793

Table 5.30 shows that a significant effect was found comparing the music therapy condition with free play ($p < .0001$), session – 1st, 4th, 8th, 12th ($p = .0055$) and unstructured and structured session part ($p = .0088$). None of the other independent variables reached significance. Inter-observer reliability reached 0.91 agreements in joy frequency. Therefore, it was very reliable data.

Figure 5.13 shows this result in a boxplot. Figure 5.13 answers these preliminary research questions; ‘are there any observable and measurable changes in one session, especially when comparing the unstructured and structured approach?’ ‘are there changes in response over time when comparing the early to late period of music therapy?’. The effect of improvisational music therapy is evident, especially in the unstructured first half of the session where the therapist allowed the child to lead the session. While joy frequency was steadily increasing over the whole selected sessions (1st, 4th, 8th, 12th) in the music therapy condition, the median value of the free play sessions remained almost steadily zero in both the structured and unstructured parts. The values of the whiskers are far more extended out in the music therapy condition while the whiskers of the free play sessions were within a very limited range.

There was more joy frequency observed in the unstructured part of improvisational music therapy than in the structured part.

This indirectly answers the qualitative question ‘does musical attunement appear to play a significant role in engaging the child into mutual play?’ since the unstructured part is where the therapist was instructed to tune in to the child’s focus of attention, activity and state.

That means the children were smiling and laughing more when they were in control of what was happening and when the therapist was tuning in to them in music therapy. In the free play condition, even though the median value almost stayed at the zero point, over the selected sessions (1st, 4th, 8th, 12th), the occurrence of joy increased, though not steadily.

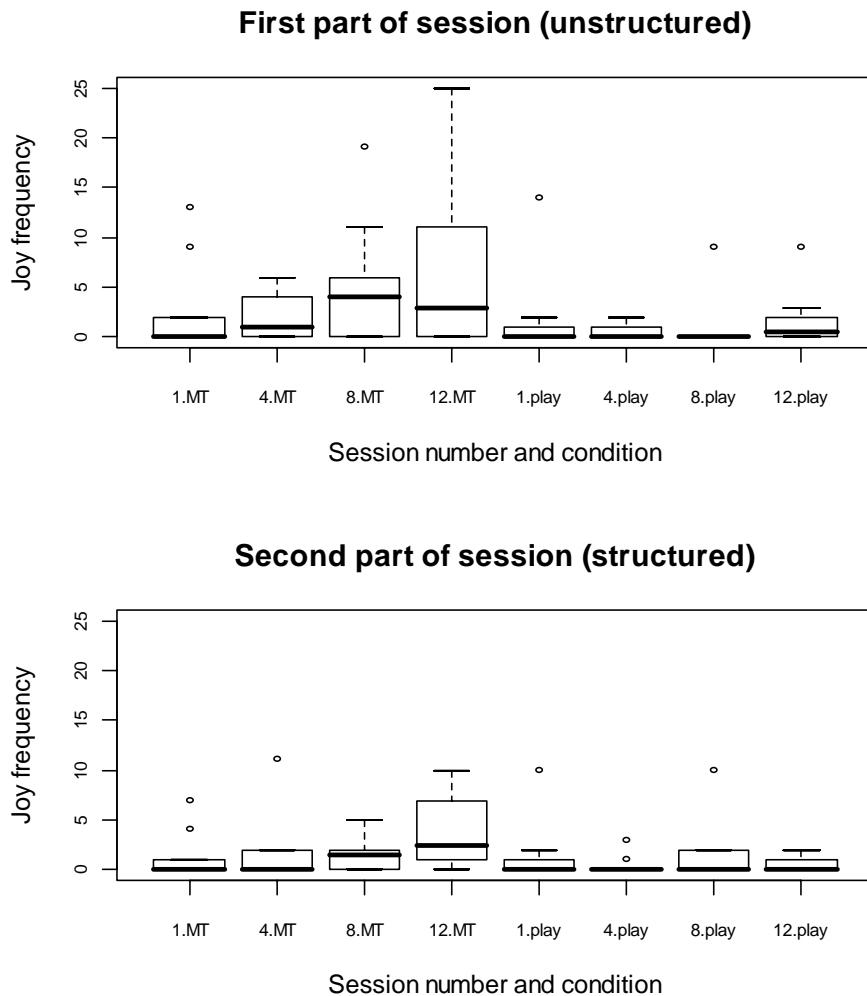


Figure 5.13 Joy frequency

Improvisational music therapy appears to promote positive emotions and its expressions in children with ASD. This finding means that children were generally happier when they were in music therapy than in the free play sessions. Emotional synchronicity is closely linked to this finding. The implication of this finding that the children tend to express positive emotions more during the musical interaction with the music therapist will be discussed fully in the individual case study and discussion section.

5.6.2.4 Joy duration

Table 5.31 presents the results from a repeated measures ANOVA of joy duration.

Table 5.31 A repeated measures ANOVA of joy duration

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	31.60849	<.0001***
Session part	1	135	8.88748	0.0034**
Session	3	135	6.05449	0.0007***
Condition : session part	1	135	1.06789	0.3033
Condition : session	3	135	0.57136	0.6348
Session part : session	3	135	1.36341	0.2567
Condition : session part : session	3	135	0.99132	0.3990

Table 5.31 shows very similar results to joy frequency. A significant effect was found comparing the music therapy condition with the free play ($p < .0001$), session – 1st, 4th, 8th, 12th ($p = .0007$) and the session part – unstructured and structured ($p = .0034$).

None of the other independent variables reached significance. Inter-observer reliability reached 0.98 agreements. Measuring facial expression of children with vocal sounds was one of the most straightforward and unambiguous tasks in the session analysis work, which gave almost perfect agreement on scores between the two independent observers.

The results are presented in Figure 5.14 in boxplots. Figure 5.14 is also quite similar to joy frequency as they are in fact the same phenomenon measured in two different ways – frequency and duration. This also answers the questions raised in the joy frequency result section. In order to avoid repetition of similar information, the questions will not be presented here (see 5.6.2.3, joy frequency). Again, the effect of improvisational music therapy was clearly more evident in the unstructured part than the structured part of the session. Although there were steady improvements over the sessions, the median values were almost at zero in the 1st and 4th sessions of music therapy, while almost all median values of the free play stayed at zero throughout the selected sessions and session parts.

The data suggests that while improvisational music therapy brought more joy to children with ASD, children did not display joyous behaviours much in free play sessions since the median values and ranges of boxes did not extend much from the zero value. Again, the implication of this finding will be discussed fully in the individual case study and discussion section.

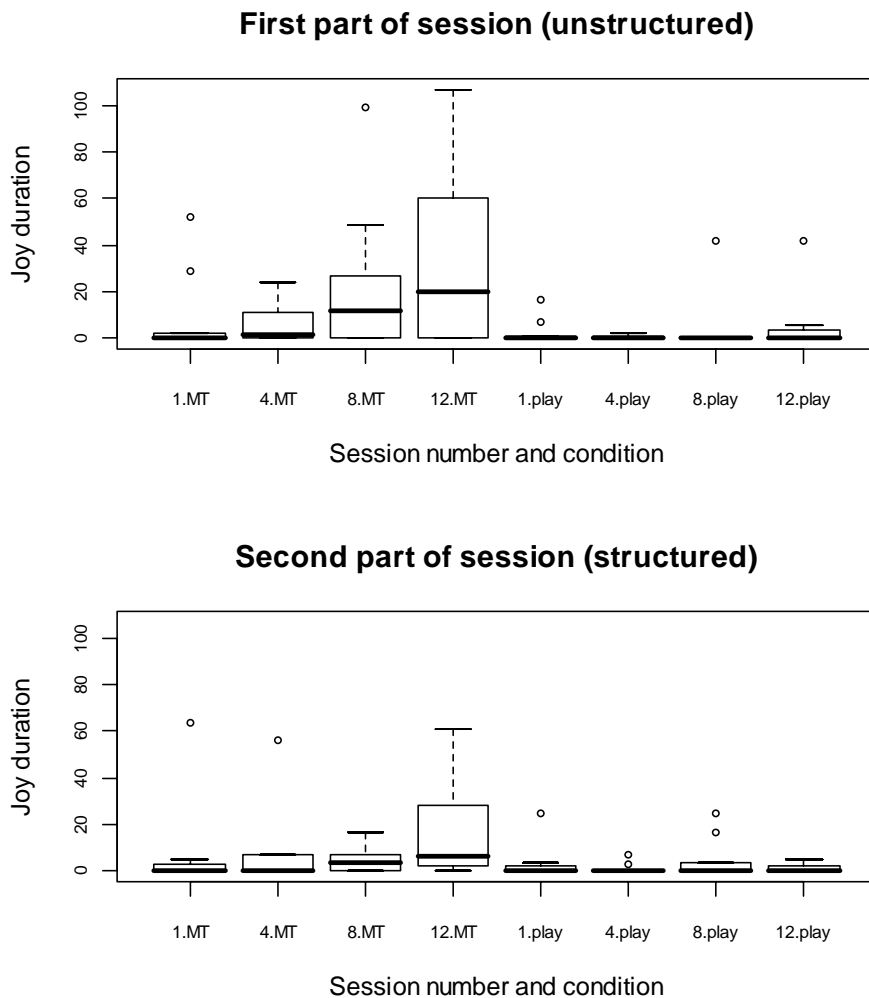


Figure 5.14 Joy Duration

5.6.2.5 Emotional synchronicity frequency

Emotional synchronicity refers to an event, when the child and the therapist share a moment of emotional affect (happiness or sadness) while engaged with the therapist. In other studies, different terms were used to describe the event such as ‘affective sharing’ (Kasari et al; 1990) and ‘affect exchange’ (Adamson and Bakeman, 1985). Strictly speaking, emotional synchronicity is not the joint attention behaviour. However, the event of emotional synchronicity is so closely connected to a joint attention episode that without the capacity to share attention with another person, one cannot have a moment of affective sharing. Therefore, events of emotional synchronicity have been included as a dependent variable in this study. In order to clarify happy emotional synchronicity, the researcher limited this category to a clearly joyful moment (when the child smiles and laughs, the therapist shows congruent behaviour to the child’s happy expression simultaneously) as the most concrete and reliable way to measure. Therefore, a happy event was congruent with a Joy event. As there were only few events of sadness during the whole trial, emotional synchronicity

frequency and duration data were closely linked to ‘joy’ data. Table 5.32 presents the results of a repeated measures ANOVA of emotional synchronicity frequency.

Table 5.32 A repeated measures ANOVA of emotional synchronicity frequency

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	31.255398	<.0001***
Session part	1	135	12.247911	0.0006***
Session	3	135	8.380856	<.0001***
Condition : session part	1	135	1.642638	0.2022
Condition : session	3	135	0.312436	0.8164
Session part : session	3	135	0.658509	0.5790
Condition : session part : session	3	135	0.786513	0.5034

As expected, table 5.32 shows similar results to those found for the frequency and duration of joy events. A significant effect was found comparing the music therapy condition with free play ($p < .0001$), differences between sessions - 1st, 4th, 8th and 12th ($p < .0001$) and the session parts - unstructured first half and structured second half ($p = .0006$). None of the other independent variables reached significance. Inter-observer reliability reached 0.90 agreements.

Figure 5.15 shows the results in boxplots. As in the results for frequency and duration of joy events, figure 5.15 answers the similar research questions described in 5.5.2.3. In fact, the data concerning joyous and affect sharing events are not strictly speaking ‘joint attention behaviour’, but developmentally related and closely linked categories of behaviours that have important implications for children with ASD as described in chapter two. The effect of improvisational music therapy was clearly evident in this figure, especially in the unstructured first half of the session. While emotional synchronicity frequency was steadily increasing over all the selected sessions (1st, 4th, 8th, 12th) in the music therapy condition, the median value of free play session remained almost steadily at the zero point in both the structured and unstructured parts. The value of the whiskers was far more extended in the music therapy condition while the whiskers of free play sessions were within very limited range.

There was more emotional synchronicity frequency observed in the unstructured part of the improvisational music therapy than in the structured part where median values were close to zero except in the 12th session.

These also indirectly answer the qualitative question ‘does musical attunement appear to play a significant role in engaging the child into mutual play?’. That means children were sharing emotions more with the therapist when they were in control of what was happening and when the therapist was tuning in to them in music therapy. During free play, even though the values almost stayed at the zero point most of the time, there were slight increases at the end of the session in the unstructured part (12th) and the structured part (8th).

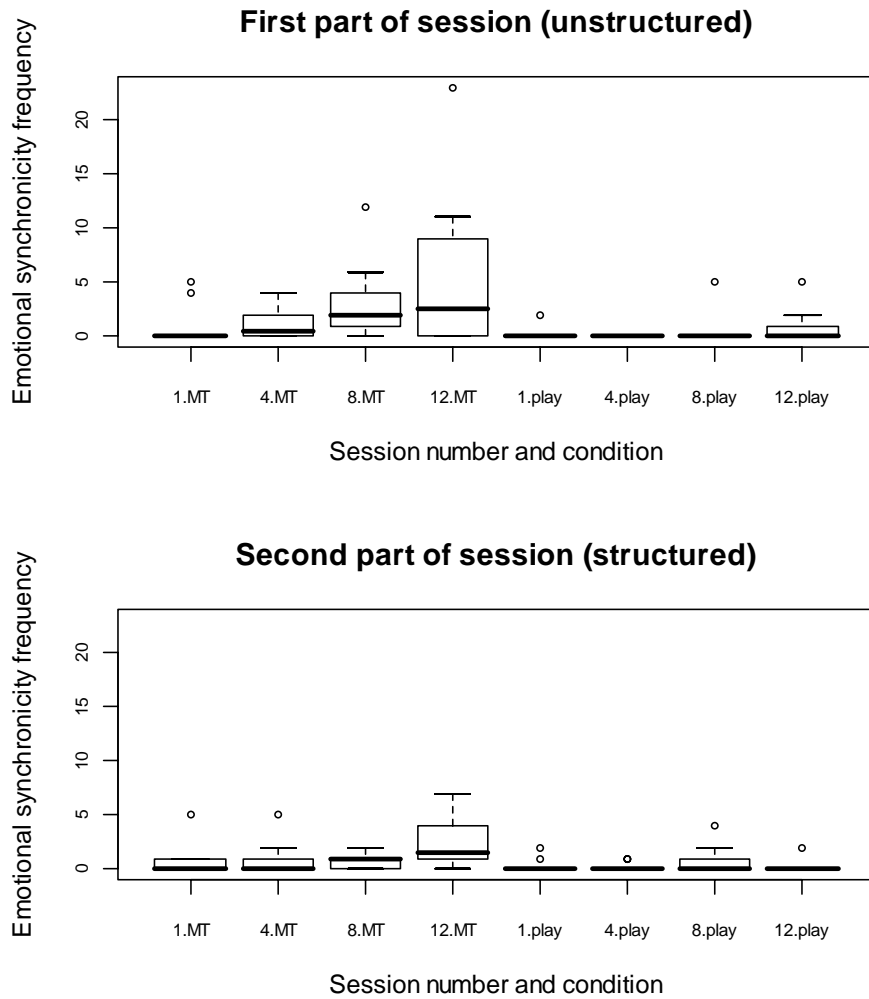


Figure 5.15 Emotional synchronicity frequency

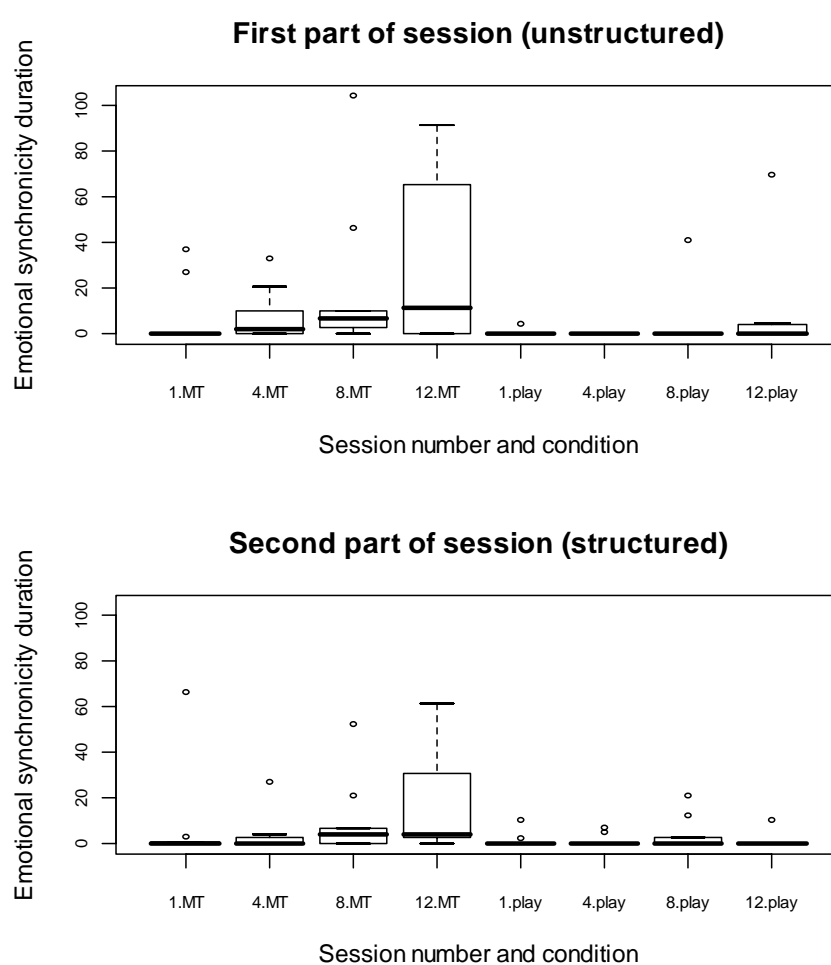
As joy was closely linked to emotional synchronicity, the implication of these findings that the children tend to share positive emotions more with the therapist during musical interaction will be discussed fully in the individual case study and discussion section.

5.6.2.6 Emotional synchronicity duration

Table 5.33 presents the results from a repeated measures ANOVA as follows. As expected, a significant effect was found in condition ($p = .0001$), session part ($p = .0079$) and session ($p = .0012$). Inter-observer reliability reached 0.92 agreements. It looks like this;

Table 5.33 A repeated measures ANOVA of emotional synchronicity duration

Variable	Numerator Degrees of Freedom	Denominator of degrees of freedom	F-value	p-value
Condition	1	135	15.80059	0.0001***
Session part	1	135	7.27062	0.0079**
Session	3	135	5.59353	0.0012**
Condition : session part	1	135	0.00004	0.9951
Condition : session	3	135	0.08730	0.9669
Session part : session	3	135	0.45000	0.7177
Condition : session part : session	3	135	0.47927	0.6972

**Figure 5.16 Emotional synchronicity duration**

The boxplots in figure 5.16 are somewhat similar to emotional synchronicity frequency and joy data, in that they are gradually getting larger, but different in that increases are disproportionate compared to emotional synchronicity frequency and joy data. In general, the emotional synchronicity duration was more pronounced in music therapy than free play sessions, especially in unstructured part. While there was evidence of steady increases in frequency of emotional synchronicity from the analysis

of the selected parts of music therapy sessions, there was a rather dramatic increase in the last session (12th) data in both the unstructured and the structured part in duration data in music therapy. The development of emotional synchronicity duration in free play is almost negligible (almost a zero value excepting for a small increase in the 12th session unstructured part and 8th session structured part). Together with joy data, the implication of the development of affect sharing events recorded as emotional synchronicity will be discussed fully in the individual case study and discussion section.

5.6.2.7 Musical synchronicity frequency

The results from a repeated measures ANOVA of musical synchronicity frequency is depicted in table 5.34.

Table 5.34 A repeated measures ANOVA of musical synchronicity frequency

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	59.5763	<.0001***
Session part	1	135	0.89673	0.3454
Session	3	135	1.31440	0.2724
Condition : session part	1	135	0.29306	0.5892
Condition : session	3	135	0.11295	0.9624
Session part : session	3	135	1.38447	0.2503
Condition : session part : session	3	135	0.83765	0.4755

Table 5.34 shows that a significant effect was found comparing the music therapy condition with free play ($p < .0001$). This answers the research question; ‘are joint attention behaviours better in music therapy when compared with free play?’. The answer is shown in figure 5. 16. None of the other variables were that significant. Inter-observer reliability reached 0.96 agreements; therefore, it was very reliable data.

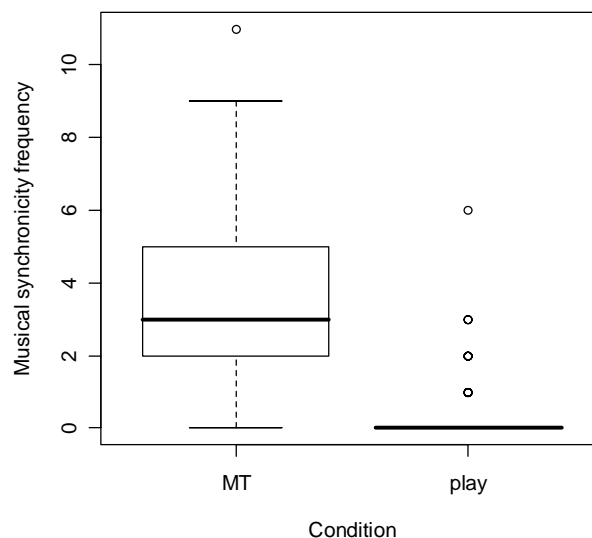


Figure 5.17 Musical synchronicity frequency

Figure 5.17 reveals how the effects of music therapy were larger than the effects of free play on musical synchronicity. As we are comparing two different media – mainly musical interaction in music therapy and mainly toy play in free play sessions, one cannot expect to score many events of musical synchronicity in the free play condition. In fact, the two conditions are incomparable for this variable. However, it is interesting to see that some musical interaction occurred in free play sessions even sporadically. Even though this answers the research question whether music therapy is better at improving joint attention than free play condition, this comparison is inherently advantageous to the music therapy condition. Therefore, these results should be treated with caution.

5.6.2.8 Musical synchronicity duration

Table 5.35 presents the results from a repeated measures ANOVA on musical synchronicity duration.

Table 5.35 A repeated measures ANOVA of musical synchronicity duration

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	76.5800	<.0001***
Session part	1	135	2.7877	0.0973
Session	3	135	2.4527	0.0661
Condition : session part	1	135	0.8664	0.3536
Condition : session	3	135	0.1662	0.9190
Session part : session	3	135	0.3824	0.7658
Condition : session part : session	3	135	0.3401	0.7964

Again, a significant effect was found in the condition ($p < .0001$). The results approached significance in the session part ($p = .0973$) and the session ($p = .0661$). If given the enough number of participants in this sample, those values might come out as significant. None of other independent variables reached significance. Inter-observer reliability reached a very high level of agreement (0.98).

Figure 5.18 shows the results of a repeated measures ANOVA in boxplots, which is quite similar to musical synchronicity in the frequency data. Here it appears that joint attention behaviour concerning musical synchronicity was greater in music therapy when compared to free play. As the researcher pointed out previously, however, this should be treated with caution since music therapy has greater advantage in this category.

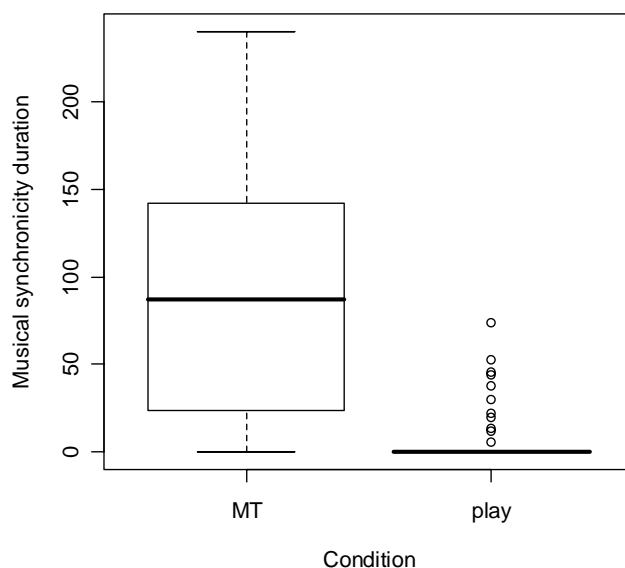


Figure 5.18 Musical synchronicity duration

5.6.2.9 Initiation of engagement frequency

The children's tendency to initiate engagement during music therapy and free play has been compared and the results are presented in table 5.36 from an analysis with a repeated measures ANOVA.

Table 5.36 A repeated measures ANOVA of initiation of engagement frequency

Variable	Numerator Degrees of Freedom	Denominator of Degrees of Freedom	F-value	p-value
Condition	1	135	54.95554	<.0001***
Session part	1	135	4.85572	0.0292*
Session	3	135	5.73023	0.0010**
Condition : session part	1	135	0.02347	0.8785
Condition : session	3	135	0.11037	0.9539
Session part : session	3	135	2.05568	0.1091
Condition : session part : session	3	135	1.26371	0.2894

A significant effect was found comparing the condition ($p < .0001$), the session ($p = .0010$) and the session part ($p = .0292$). There was no significance found in other independent variables. Inter-observer reliability reached 0.93.

Figure 5.19 presents this result in a boxplot and this answer the following analysis questions:

- Was music therapy significantly better than free play at improving joint attention behaviours?
- Were there observable and measurable changes in one session, especially when comparing unstructured and structured part?
- Were there changes in response over time from the early to late period of music therapy?

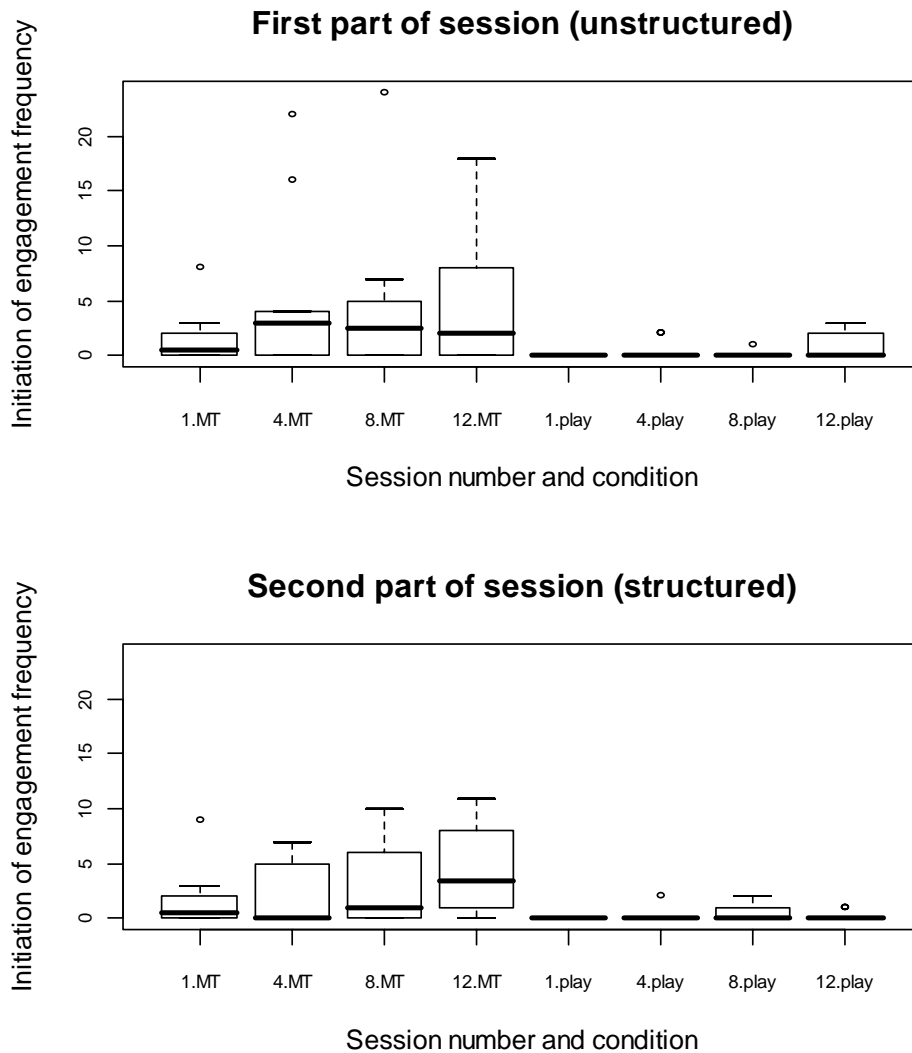


Figure 5.19 Initiation of engagement frequency

The results display that music therapy has a greater effect in improving initiation of engagement in frequency than does free play. There were observable and measurable changes in one session in both the music therapy and the free play condition, although the both changes and effects were more pronounced in the music therapy condition. The changes appeared to begin during the 4th session (the first sessions appeared to be quite stable both in music therapy and free play). From the 4th session a slight variation developed. The median value in the 4th, 8th and 12th unstructured part of music therapy session stayed more or less the same, while the box and range of the whiskers values are steadily expanded. In the structured part of music therapy, the median value and box value were raised slightly over time. Overall, the children were slightly more able to show initiatives in the unstructured parts of the sessions in both conditions, and the initiatives are markedly more frequent in music therapy than in free play.

5.6.2.10 Turn-taking frequency

Table 5.37 presents the results of a repeated measures ANOVA in turn-taking frequency.

Table 5.37 A repeated measures ANOVA of turn-taking frequency

Variable	Numerator Degrees of Freedom	Denominator of Degrees of Freedom	F-value	p-value
Condition	1	135	58.04572	<.0001***
Session part	1	135	0.02218	0.8818
Session	3	135	2.08736	0.1048
Condition : session part	1	135	0.00266	0.9589
Condition : session	3	135	0.81565	0.4873
Session part : session	3	135	0.34194	0.7950
Condition : session part : session	3	135	0.65123	0.5835

Table 5.37 reports that a significant effect was found comparing music therapy with the free play condition ($p < .0001$). None of the other probability levels in the interaction of the independent variables were significant. Inter-observer reliability was 0.94 agreements in turn-taking frequency.

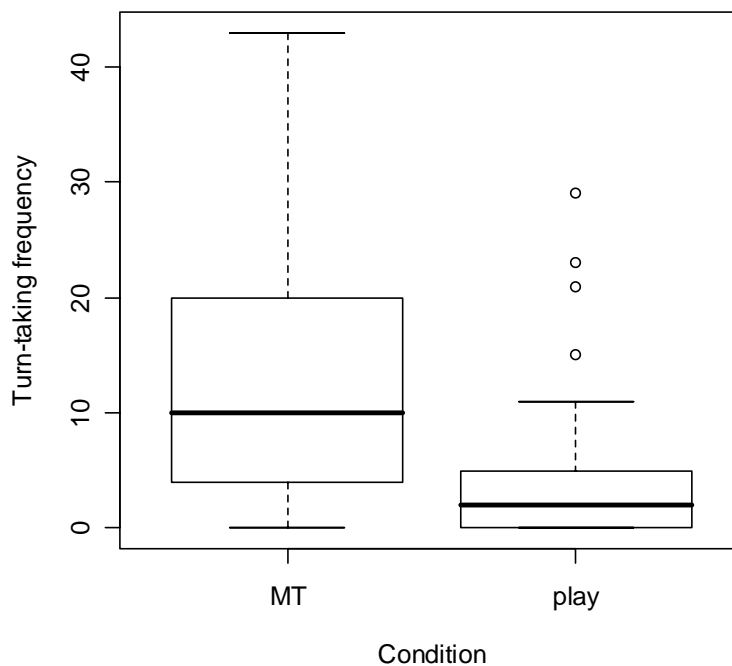


Figure 5.20 Turn-taking frequency

Figure 5.20 illustrates the results of this analysis with a boxplot. Figure 5.19 shows significant differences between the music therapy and the free play condition. Music therapy is better at facilitating turn-taking behaviours in children with autism

than the free play condition. The median value, box size and the extension of whiskers were far outstretched in the music therapy condition than the free play condition.

5.6.2.11 Turn-taking duration

Table 5.38 show the results of a repeated measures ANOVA of turn-taking duration. Table 5.38 reports significant effects of condition ($p < .0001$) and session part ($p = .0370$). The p value of session appeared close to significance ($p = .0512$), and may reach significance if given a larger sample. None of the interactions of other independent variables reached significance. Inter-observer reliability reached 0.92 level of agreement.

Table 5.38 A repeated measures ANOVA of turn-taking duration

Variable	Numerator Degrees of Freedom	Denominator of Degrees of Freedom	F-value	p-value
Condition	1	135	47.737	<.0001***
Session part	1	135	4.438	0.0370*
Session	3	135	2.654	0.0512
Condition : session part	1	135	1.300	0.2562
Condition : session	3	135	0.737	0.5316
Session part : session	3	135	0.314	0.8150
Condition : session part : session	3	135	0.184	0.9068

Figure 5.21 presents the data in boxplots.

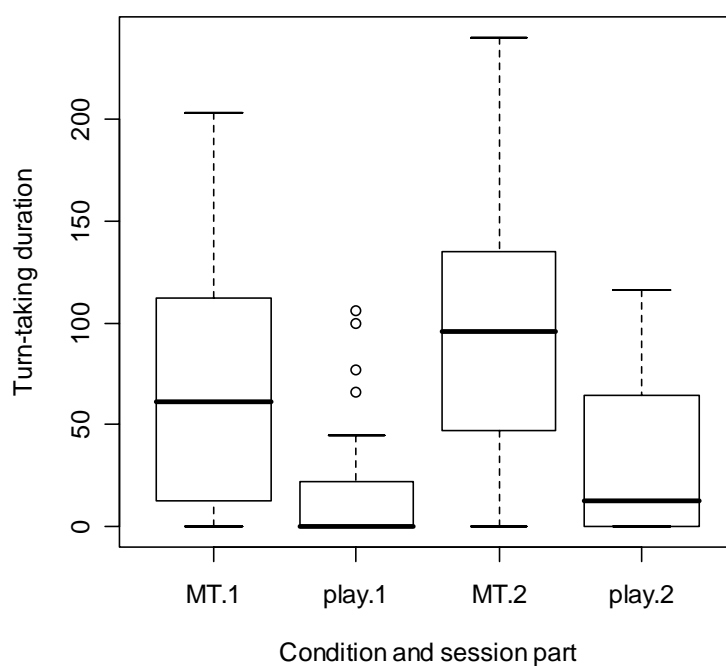


Figure 5.21 Turn-taking duration

Figure 5.21 indicated that the music therapy condition was more effective at facilitating a longer turn-taking duration than the free play condition. In contrast with previous variables such as joy or emotional synchronicity, there were longer durations of turn-taking activity in the second (structured) half of the sessions in both music therapy and the free play condition than in the first (unstructured) half. This may be due to the clinical protocol of the study where the therapists are instructed to introduce either modelling, or turn-taking activities to the children in the second half of the session. These results suggest that the turn-taking may occur spontaneously in the first half, but occurred more in second half when clinical direction was influencing the child that way.

5.6.2.12 Imitation frequency

The following reports the results of a repeated measures ANOVA of imitation frequency.

Table 5.39 A repeated measures ANOVA of imitation frequency

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	0.599355	0.4402
Session part	1	135	0.520947	0.4717
Session	3	135	0.749755	0.5243
Condition : session part	1	135	0.066415	0.7970
Condition : session	3	135	0.133813	0.9398
Session part : session	3	135	1.591027	0.1945
Condition : session part : session	3	135	0.144434	0.9331

Table 5.39 reports no significant results in any interactions between variables presented here. There were 5 sub-categories in imitation; verbal, vocal, musical, gestural and delayed response, and the ICC reported low inter-observer reliability (0.69).

5.6.3 Dependent variables concerning social invitation

There are categories that belong to social invitation in this study. This was explained fully in chapter 4.7.4. Social invitation also involves a three-way exchange between the child (self), objects (or events) and another person. The reason for measuring the social invitation category is to answer the last research question concerning fidelity to the treatment manual, evaluating whether the therapists were able to follow the directions of the treatment manual. The results of the analysis of Initiation of Interaction Frequency will partly answer that question. Measuring three different types of Response to Requests is to know how cooperative and responsive children's behaviours were over time and whether there was a difference in the two different conditions.

5.6.3.1 Initiation of interaction frequency (therapist)

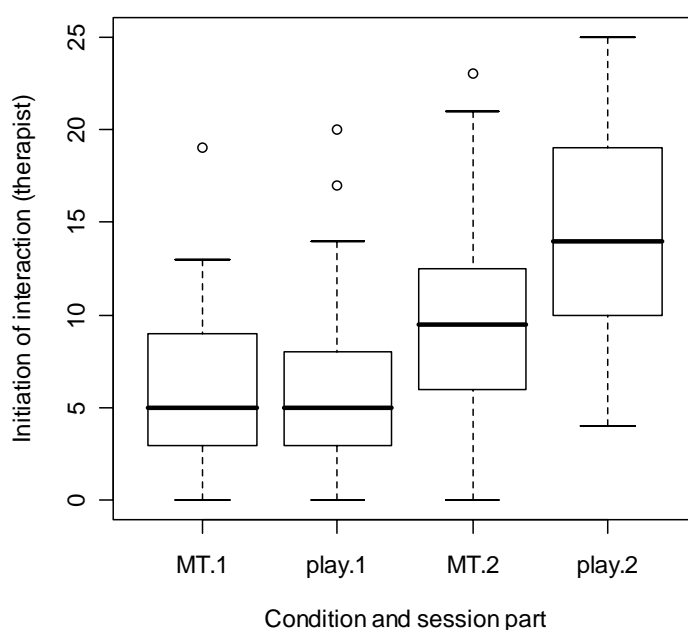
This category is concerned with social invitation and table 5.40 presents the results of a repeated measures ANOVA.

Table 5.40 A repeated measures ANOVA of Initiation of interaction frequency

Variable	Numerator Degrees of Freedom	Denominator of Degrees of Freedom	F-value	p-value
Condition	1	135	9.4027	0.0026**
Session part	1	135	60.0028	<.0001***
Session	3	135	0.0132	0.9979
Condition : session part	1	135	3.3170	0.0708
Condition : session	3	135	0.3141	0.8152
Session part : session	3	135	0.7794	0.5074
Condition : session part : session	3	135	0.3434	0.7940

Table 5.40 reports that a significant effect was found comparing the music therapy with the free play condition ($p = .0026$), and the unstructured with the structured part of the session ($p < .0001$). Condition \times session part results approached significance ($p = .0708$), which may reach significance with a larger sample. No further interactions between other independent variables were significant in this small sample. Inter-observer reliability reached 0.86 agreements, which is good enough.

The results are presented in figure 5.22. In both conditions, the structured part of the session reported a higher frequency of initiation of interaction than the unstructured part, confirming the treatment manual question for the fidelity check. The median values of music therapy and free play are quite similar in the unstructured part (first half session – MT.1 vs. play.1) with slight differences in box size and the length of whiskers.

**Figure 5.22 Initiation of Interaction by the therapist**

The above results mean that in the first half of the session, the therapists' initiation of interaction appeared to be within a similar range of frequencies in both conditions. In the second half, however, the difference between the music therapy and the free play condition was more pronounced. For the structured part, the median value, box size and range of whiskers are slightly shorter in the music therapy than the free play condition. This is perhaps due to the differences in musical and toy play interaction. The researcher discovered from both the session analysis data and from the direct observation of treatment sessions that musical interaction between the child and the therapist tended to be longer than toy play interaction. For example, if the child was engaged in turn-taking activity with the therapist spontaneously, the therapist does not need to introduce another activity while the turn-taking interaction was going on. This was the case for one particular child where the turn-taking activity with sliding whistles was going on for the entire selected four minutes of the structured part of the particular session. Therefore there was no 'space' or need for the therapist to initiate interaction with the child. The more solo play in which the child was engaged, the more verbal language and initiatives the therapist produced in order to compensate for the aloofness of the child. In music therapy, in most cases, the children were engaged for a longer duration as shown throughout the other session analysis results, therefore, on the whole the music therapist's 'initiation of interaction frequency' appeared to be less than the therapists in free play.

5.6.3.2 Response to Initiation of Interaction (by therapist)

Response to requests (initiation of interaction by therapist) is divided into three sub-items; compliant response, non-compliant response and no response. These three sub-items show the total possibilities of response to Initiation of Interaction. The frequencies of the therapist's initiated interactions are connected to the total number of the response to requests of the child. If the therapist made seven initiation of interaction, there were seven corresponding responses to requests. Here in this section, the questions for analysis (4.9.3 – No 17, 18, 19) were set out to find out what percentage of each respective response was occurring depending on the condition and session. The following results from a repeated measures ANOVA presents each respective response. Data screening suggested that the percentage of compliant responses was close to a normal distribution whereas the percentages of non-compliant responses and no responses respectively were not.

5.6.3.2.1 Compliant response

Table 5.41 reports a repeated measures ANOVA and boxplots:

Table 5.41 A repeated measures ANOVA of compliant response frequency

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	26.34267	<.0001***
Session part	1	135	0.06767	0.7952
Session	3	135	2.76920	0.0444*
Condition : session part	1	135	0.47444	0.4922
Condition : session	3	135	1.12182	0.3428
Session part : session	3	135	0.76366	0.5164
Condition : session part : session	3	135	0.33436	0.8005

Table 5.41 reveals that condition ($p < .0001$) and session ($p = .0444$) were significant. And p values in other independent variables were not.

Figure 5.23 provides the boxplot that depicts the results. Figure 5.23 shows that there were more compliant behaviours shown by children with ASD in the music therapy than in the free play condition. In both conditions, either the median value, or the box size were increasing over 4 sessions. In the music therapy condition, the box size dramatically increased up to 100 % in the 4th session whereas in the 8th and 12th session, the median value was slightly increased with smaller ranges. Throughout the music therapy condition, the values of whiskers were extended by up to 100 % and that was quite remarkable when compared with the free play condition, which reported less compliant behaviours. Even in the free play condition, the ranges of compliant response behaviours were steadily increasing so that it reached zero to 100 % of compliant response behaviour range by the 12th session.

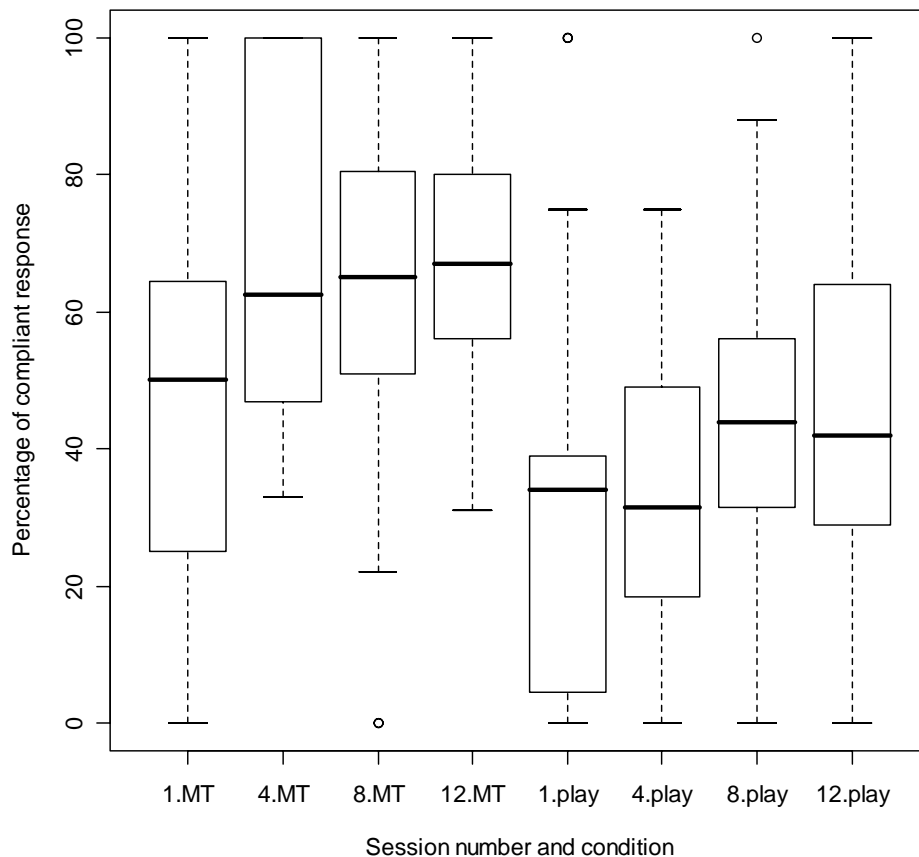


Figure 5.23 Compliant responses by children with ASD

5.6.3.2.2 Non-compliant response

Table 5.42 reports the results of a repeated measures ANOVA of non-compliant response in frequency.

Table 5.42 reports a significant effect comparing sessions - 1st, 4th, 8th and 12th ($p=.0137$). Interaction between condition approached significance ($p=.0516$). As this study involves only 10 subjects, the level of significance may increase given a larger sample. None of the other independent variables reached significance.

Table 5.42 A repeated measures ANOVA of non-compliant response frequency

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	135	3.85892	0.0516
Session part	1	135	0.66238	0.4172
Session	3	135	3.69398	0.0137*
Condition : session part	1	135	0.00340	0.9536
Condition : session	3	135	0.30800	0.8196
Session part : session	3	135	0.07291	0.9744
Condition : session part : session	3	135	0.49337	0.6875

Figure 5.24 illustrates the results of the analysis of non-compliant responses. The median values and ranges of boxplots over four selected sessions in both conditions appeared to decrease. The result is a hopeful sign for children with ASD. The therapeutic implication of this will be discussed more in the final chapter.

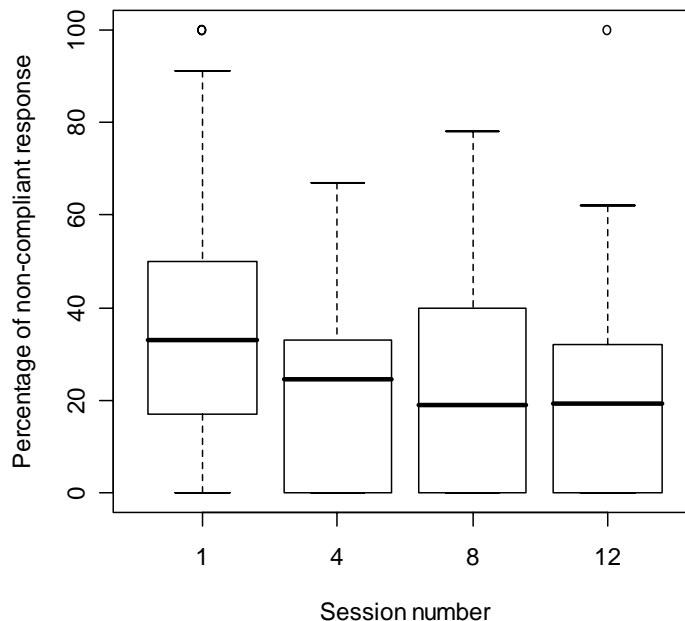


Figure 5.24 Non-compliant response

5.6.3.2.3 No response

Table 5.43 reports the results of a repeated measures ANOVA of no response data in frequencies.

Table 5.43 A repeated measures ANOVA of no response frequency

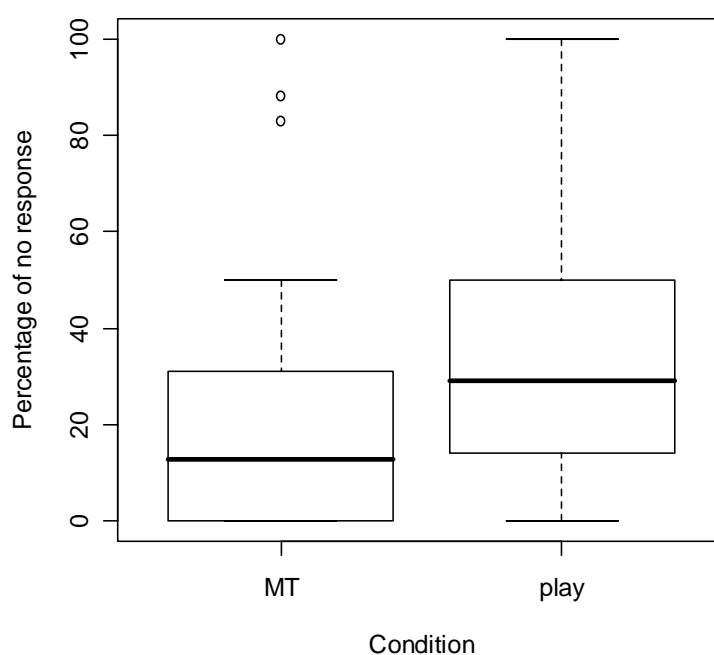
Variable	Numerator Degrees of Freedom	Denominator of Degrees of Freedom	F-value	p-value
Condition	1	135	12.3344	0.0006***
Session part	1	135	0.2954	0.5877
Session	3	135	0.1453	0.9325
Condition : session part	1	135	0.3894	0.5337
Condition : session	3	135	0.7964	0.4981
Session part : session	3	135	0.5945	0.6197
Condition : session part : session	3	135	1.6697	0.1768

Table 5.43 reports that the difference between conditions is significant ($p=.0006$), but no other interactions between variables are at all significant.

Figure 5.25 presents this result in boxplots. There were approximately double the frequencies of no response behaviour displayed by children with ASD in the free play session compared with the music therapy condition. In other words, the children were responding more (whether positive or negative) in music therapy sessions to the therapists' initiation of interaction. Previously the result suggested that the range of compliant behaviours were larger in the music therapy condition than in the free play condition. Earlier, there were results showing that children were displaying joy and emotional synchronicity in music therapy far more than in free play.

The implication of this finding will be discussed fully in the final chapter.

Figure 5.25 presents a boxplot of the analysis of no response data.

**Figure 5.25 No response**

5.6.4 Salient features in the music therapy and the free play condition

This section deals with the research questions regarding the salient features in both conditions (main research question 2 and sub-questions; 2.1; 2.2), which includes salient musical elements during musical synchronicity events between the child and the therapist and the children's preference of objects in both conditions. In order to answer the research questions, up to two salient elements of music during musical synchronicity were recorded and treated statistically. Instruments and toys chosen and played during the clinical trial have been recorded and the results treated statistically as well. The results are depicted the following tables and figures.

5.6.4.1 Salient musical elements in the music therapy and the free play condition

Table 5.44 reports the results of a repeated measures ANOVA of salient musical elements as follows:

Table 5.44 A repeated measures ANOVA of salient musical elements

Variable	Numerator Degrees of Freedom	Denominator of Degrees of Freedom	F-value	p-value
Elements	4	351	43.67074	<.0001***
Condition	1	351	103.63191	<.0001***
Session	3	351	1.83235	0.1409
Element : condition	4	351	1.36317	0.2463
Element : session	12	351	0.71660	0.7353
Condition : session	3	351	1.10379	0.3476
Element : Condition : session	12	351	0.05601	1.0000

Table 5.44 shows that element and condition are significant ($p < .0001$). All of the other independent variables are not significant.

Figure 5.26 reveals that in music therapy, rhythm and dynamic appeared to be the two most salient elements during musical synchronicity events between the child and the therapist.

Clinical observation and records of each session confirms also that when the children were relatively well-engaged showing some levels of spontaneity in musical interaction with the therapist, approximately in the middle of (4~7th session) the clinical trial period, gestural elements in musical interaction stood out as one of the important elements between the child and the therapist. This was mostly initiated by children. Not every child, but the children in this particular case not only interacted musically, but they interacted with the music therapist with increasing complexity using spontaneous gestures, body movements simultaneously with increased eye contact (visual referencing behaviour). This will be described fully in Chapter 6 and 7.

Vocalization appeared the second least frequently observed musical element in musical synchronicity events. Melody was the least observed element of music in musical synchronicity events.

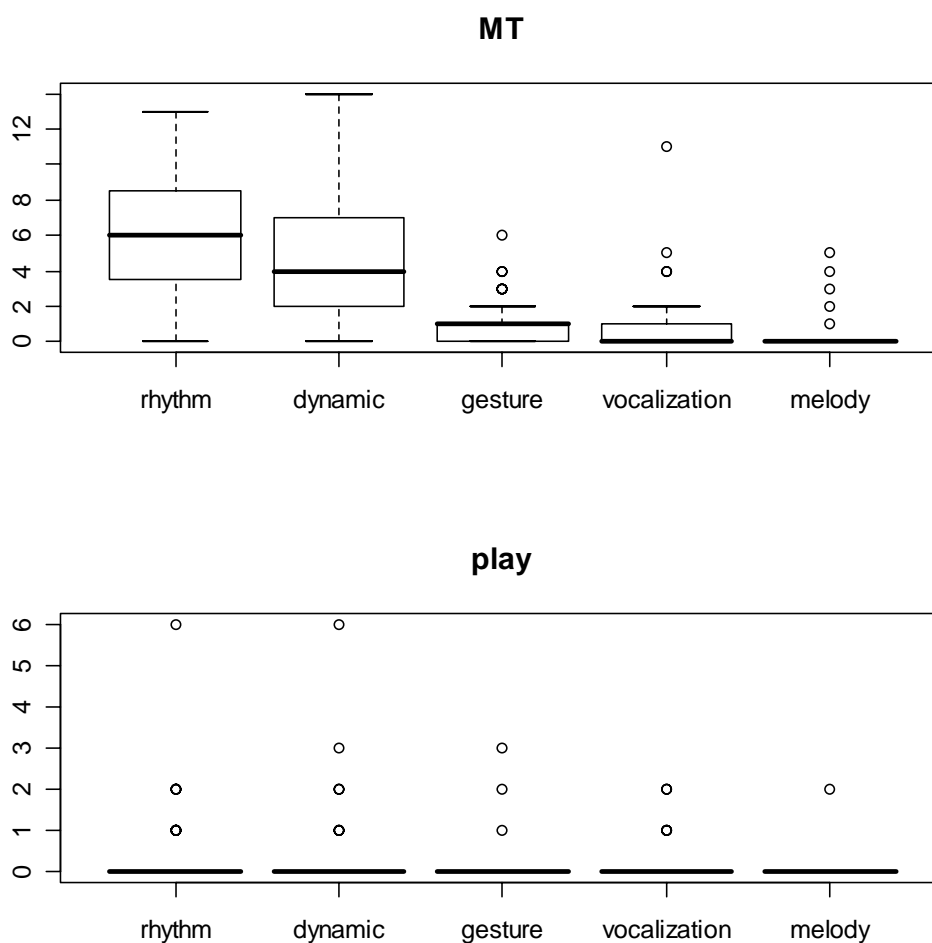


Figure 5.26 Salient musical elements

As must be expected, there was so little musical data in free play that making a distinction among the five elements was not relevant. However, even though there were no boxes in the free play condition, figures suggest that rhythm, dynamics and gesture play an important role in the free play condition when there was occurrence of musical synchronicity at all.

5.6.4.2 Children's preference of objects in both conditions

The bar graphs depicted here show the order of the most selected instruments / toys to the least selected ones. The most selected instruments in the music therapy condition are in order of ranking 1) horns and whistles; 2) piano; 3) timpani drum; 4) vocalization; 5) cymbal; 6) xylophone; 7) handballs; 8) chroma harp; 9) guiro; 10) gesture and movement, 11) tone bars. The three least selected instruments were egg shakers, finger cymbals and paddle drums.

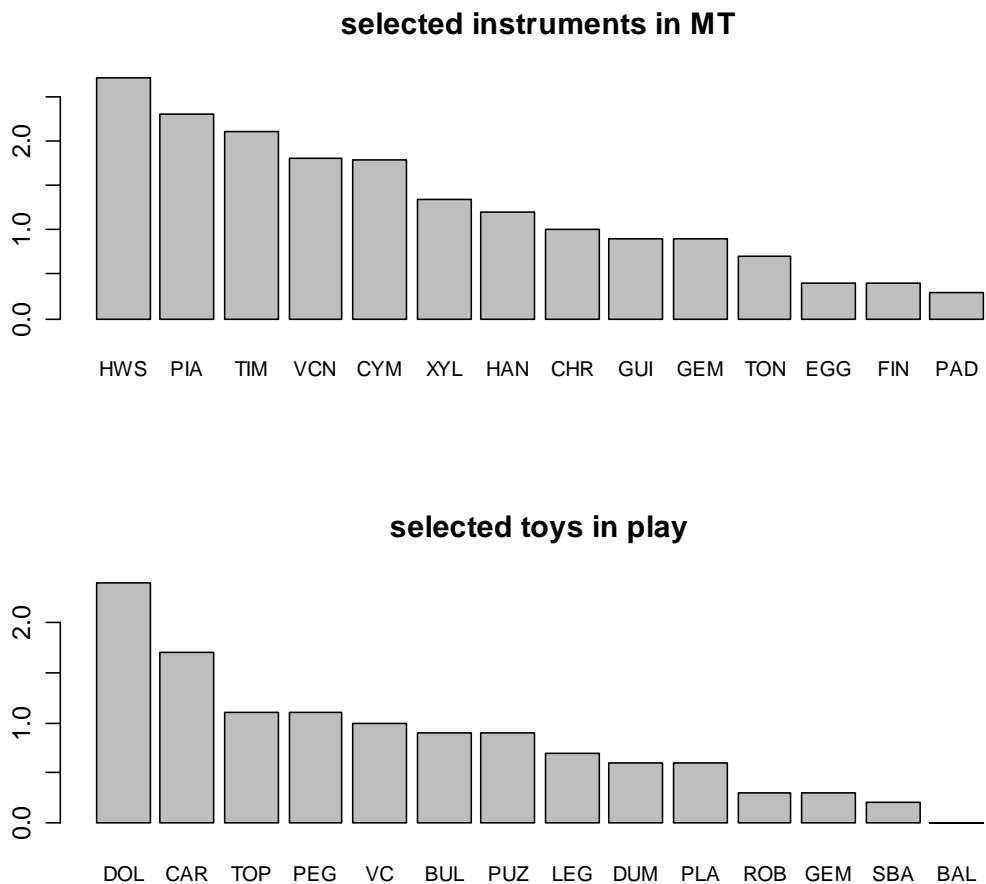


Figure 5.27 Selected objects in both conditions

The most selected toys in order of ranking were; 1) doll house; 2) cars; 3) top; 4) peg (wood) kitchen play set; 5) vocalization; 6) bulldozer; 7) puzzle; 8) lego; 9) dump truck; 10) play dough; 11) robot. The three least selected toys were small balls, big balls, and gesture/movement.

This result is quite surprising in that horns and whistles were selected more than the piano, the drum and the cymbal, which appeared to be the typical instruments most widely used in improvisational music therapy. However, the result of this data should be treated with caution since horns and whistles were often selected by the children who are either verbal, or knew how to blow. Low functioning children who did not understand the act of blowing, did not respond well to horns and whistles. It is also interesting to find out that the doll house was the most selected toys among children with autism. The implication of the selected objects in both conditions will be discussed further in the discussion section.

5.7 Conclusion

Five different sections of group results have been presented in this chapter that dealt with the primary research question; “do children show observable and measurable changes in joint attention behaviour in response to improvisational music therapy?”. There were four types of data on which many different analyses were done; including PDDBI, ESCS, MPIP, and session analysis results. In all measurements, a repeated measures ANOVA was used and the effect size was calculated to examine the magnitude of changes. For inter-observer reliability and correlation coefficient, the Intra Class Correlation Coefficient was used. The implications of each finding will be fully discussed in the final chapter. The following chapter will introduce some individual results together with individual case studies and non-statistical clinical data concerning each individual child.

CHAPTER 6

INDIVIDUAL CASE STUDIES

This chapter presents the results and research records of each individual child's case included in this project, and include some discussion of the descriptive analysis of the sessions. While much of the analyses of session data are documented in the appendices, some material, and the relationship of these analyses to theory, is presented here. Consequently this chapter is quite lengthy, while the final discussion will confine itself to the main theme of the study.

A total of 10 case studies of subjects in this study are going to be presented in this chapter, and in each case a systematic presentation of results will be made in the following order:

1. Case information
2. Early history and concerns of the parents
3. Relevant background information about the mother
4. Individual report from the pre, in between and post treatment measures of:
 - 1) Pervasive Developmental Disorder Behavior Inventory (PDDDBI)
 - 2) Early Social Communication Scales (ESCS)
 - 3) Mother Play Intervention Profile (MPIP)
5. Clinical vignette with descriptive analysis and discussion: Music therapy vs. free play
6. Postlude

In addition to quantitative measures of pre to post measurements and target behaviour analysis of selected sessions, events and clinical behaviours in each of the 10 children's sessions were recorded in both conditions in real time. An Example of such clinical records is presented in appendix 10.20. Although the details of session records will not be presented in this PhD thesis, the clinical vignettes are based on this micro analytic level of session records throughout the period of this trial.

6.1 Subject A

6.1.1 Case information

Subject A was a verbal, high-functioning 3.4-year-old child diagnosed with ASD. Table 6.1 presents the case information, which was previously presented as part of the whole group of subjects in table 4.3. The explanation of abbreviations used in table 4.3 is once more stated in the footnote. The footnote will not be repeated in the remaining cases studies.

Table 6.1 Case information¹ of subject A

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
A	1	3.04	Mild	V	34.0	NT	64.0	NT	N	M	N

6.1.2 Early history and concerns of the parents

A was the first and the only child in the family. Physical developmental milestones were within normal range. At the age of 29 months, his mother visited the child & adolescent psychiatry unit at Seoul National University Hospital (SNUH) because of A's language delay and tendency to play alone and obsessively with certain objects. His mother reported that A was extremely stubborn and tended to persevere in some of his rituals and easily became upset at changes. A good example was his first visit to the clinic. A threw temper tantrums, cried uncontrollably and struggled with his mother because he could not bear to enter the new building where the clinic was located. A also had a severe constipation problem and by habit had to stand up in order to defecate, which became quite an issue between his mother and him. At 2.7 years, A was diagnosed with ASD and began to receive special education and therapy.

6.1.3 Relevant background information about the mother and the family

A's mother was a loving and trusting person willing to help her child as well as she could. During the first interview, she informed the researcher that she stayed with A alone most of the time at home after his birth. She wondered whether the lack of contact with other people and her inadequacy in childcare might have contributed

¹ Sub = subject; Age = the age when the child entered the trial, year and month; MR = mental retardation; Lan = language ability, V= verbal, PV = pre-verbal; NT = Not Tested; KCARS = Korean Version of CARS Score; SMS = Social Maturity Scale, Social Quotient; PEP = Psycho Educational Profile, Developmental Quotient; ADOS = The Autistic Diagnostic Observation Schedule, NT = not tested, C = tested and confirmed as autistic; Med = Medication, N = no medication, Me = stabilized medication throughout the trial period, CM = changes in medication; Eco = home economic situation, M = middle class, L = low income family; Sib = sibling, N = no sibling, 1/No = 1 normal sibling, 1/ab = 1 sibling with some problems.

to the current condition of A. Most of all, she said that the early music therapy sessions made a good impression on her and she trusted the researcher as the professional on whom she could rely.

6.1.4 Results from the analysis of pre, in between and post treatment measures

The individual scores of the PDDBI, the ESCS and the MPIP are presented and explained in this section.

6.1.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

As explained previously, the PDDBI is an informant based rating scale completed by the mothers and the professionals in this study. The scores represent the mothers' and the professionals' perception of each child's behavioural changes in regard to joint attention. The higher the score is, the better the skills in social approach behaviours, including joint attention. This explanation will not be repeated in the remaining case studies. Table 6.2 presents the scores of social approach behaviour – from the PDDBI scoring done by the mother and the professional.

Table 6.2 A's PDDBI-social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre MT</i> ²	<i>In between MT and FP</i> ³	<i>Post FP</i>	<i>Pre MT</i>	<i>In between MT and FP</i>	<i>Post FP</i>
A	1	92	94	95	31	53	64

On the whole, both the mother and the professional (the teacher in special physical education) recognized improvements in both conditions. While the mother gave very high scores compared to the professional, the improvements were more pronounced in the professional's in between and post scores. Both in the mother's and the professional's scores, there was more progress in the music therapy condition than in the free play condition, albeit only slightly so in the mother's scores.

6.1.4.2 Early Social Communication Scales (ESCS)

Some sub-scales of the ESCS do not have a definite range of scores (IJAL; IJAH; ISITs) while the rest have scores of a definite range. In order to clarify a clear structure and nomenclature of the nine sub-scales and to avoid unnecessary replication of these terms, the researcher briefly re-states these in table 6.3 as they apply to the results of this and the following chapter. This will not be repeated again.

² Throughout tables representing pre to post measures, MT stands for music therapy.

³ Throughout tables representing pre to post measures, FP stands for free play.

Table 6.3 Nine sub-scales and the scoring range of scores of ESCS

<i>Full terminology and abbreviations</i>	<i>The scoring range of frequency scores</i>
<i>Initiation of Joint Attention Lower (IJAL)</i>	No definite range
<i>Initiation of Joint Attention Higher (IAH)</i>	No definite range
<i>Responding to Joint Attention Lower (RJAL)</i>	From 0 to 6
<i>Responding to Joint Attention Higher (RAH)</i>	From 0 to 8
<i>Initiation of Social Interaction, turn-taking (ISITt)</i>	From 0 to 2
<i>Initiation of Social Interaction, song/tickle (ISIS)</i>	From 0 to 2
<i>Initiation of Social Interaction, teasing (ISITs)</i>	No definite range
<i>Responding to Social Interaction Lower (RSIL)</i>	From 0 to 6
<i>Responding to Social Interaction Higher (RSIH)</i>	From 0 to 7

Table 6.4 presents A's individual sub-scale scores of ESCS.

Table 6.4 A's sub-scale scores of ESCS

<i>Subject</i>	<i>Group⁴</i>	<i>Time</i>	<i>IJAL</i>	<i>IAH</i>	<i>RJAL</i>	<i>RAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
A	I	Pre MT	10	1	5	5	2	3	0	2	6
		In between MT & FP	15	0	5	8	2	1	0	3	7
		Post FP	14	1	6	8	2	2	0	5	7

A's score came out quite similar to the pooled ESCS scores of the group reported in chapter five (Figure 5.3, 5.4, 5.5). The most noticeable changes here, as with all participants, were the IJAL (eye contact, alternating eye contact between the tester and the object) scores. Child A also shows marked changes in the RAH (following the line of regards via poster pointing) sub-scale after the music therapy condition. The changes in other sub-scales were quite small compared to these two scales. The implication of IJAL and RAH will be discussed further in the final chapter.

6.1.4.3 Mother Play Intervention Profile (MPIP)

The MPIP is the unstructured free play at home between the mother and the child. This measures six sub-categories of how the mother and the child play at home situation. Table 6.5 presents MPIP scores of A.

⁴ 1 = music therapy first and free play later; 2 = free play first and music therapy later

Table 6.5 A's MPIP⁵ scores

Subject	Group	Time	MS ⁶	MA ⁷	MP ⁸	MI ⁹	CI ¹⁰	SC ¹¹
A	1	Pre MT	M	Of	Oc	M	N	M
		In between MT and FP	M	M	N	M	N	Of
		Post FP	Oc	Oc	Of	M	N	M

Most of the time, A's mothers appeared to structure the play, by actively initiating interaction and offering social cues to A, who initiated almost none of the time. In retrospect, what MPIP did not measure was the responsiveness of the child towards his mother's initiative of interaction. Although the degree of A's initiative in play with his mothers did not change, A's responsiveness towards his mother increased to the degree that his mother was able to lower her level of structuring, from being active to finally being able to be more 'passive'¹² and in 'tune' with A.

In the first data collection (pre treatment), A became quite obsessed with the camcorder stand, which the research assistant brought with him. It became an obstacle to interaction with his mother. The consequence was that his mother became quite directive telling him what to play and how to play.

During the second data collection (after music therapy), his mother read a book for A and constantly asked questions directing A's attention to specific pictures in the book such as "where is the moon?". A pointed and said "here".

The last data collection (after free play) included some form of pretend play (hospital, phone calls). This time, his mother was able to let A to choose what to play even though she was still very actively suggesting and asking a lot of questions.

6.1.5 Clinical vignette with descriptive analysis and discussion

Child A had music therapy first and the free play session later. The raw data of session analysis of each individual including A is presented in appendix 10.19. In

⁵ MPIP is a Likert scale: N=almost none; Oc=occasionally; Of=often, Mo=most times

⁶ MS; the degree of the mother structuring the play

⁷ MA; the degree of the mother being active in play

⁸ MP; the degree of the mother being passive in play

⁹ MI; the degree of the mother initiating interaction with the child

¹⁰ CI; the degree of the mother initiating interaction with the mother

¹¹ SC; the degree of the mother offering social cue during the play

¹² In this context, 'passive' and 'in tune' means 'the mother's ability to allow the child's lead, to read the child's cues and action, to understand what the child's needs and wants, and to demonstrate the capacity to respond appropriately' before the mother actively offers the structure, initiatives and social cues.

this section, the general development of each child, including relevant features or issues concerning the child throughout the period of the trials in each condition (music therapy vs. free play) will be presented.

6.1.5.1 Improvisational music therapy

Development of musical communication: A's music therapy session was begun by the development of mutual interaction themes (as described in chapter 3.5.2) through the therapist's matching technique. During the first session, there was a moment when A spontaneously played the Sonor 20 inch timpani drum (This will be addressed only as the drum) with his two hands and the therapist joined him by singing and playing, matching his tempo, dynamic and rhythm. This was extended to the drum and the cymbal play and with the therapist's accompaniment by singing and playing the piano. In this play, both A and the therapist was able to synchronize and adjust to each other's musical expression (musical synchronicity). This instrumental playing has been repeated many times and became an enjoyable ritual where spontaneous eye contact, smiles and emotional synchronicity occurred. As cited earlier in chapter 3.5.4, music therapy offers a rare opportunity for the autistic child to be 'more in control, and even musically direct the behaviour of an adult' (Wigram, 1995). The child being in control of what happens in interaction with the therapist is also closely related to the control issues (defensive behaviours) across the cases in this study. Almost all of the children in this study, including A, responded very well to such a structure of music therapy throughout the trial period.

The initiation of gestural interaction: What was noticeable with A (also observed with some other children) was that he initiated interaction through gestures from the 4th session. During the drum playing, suddenly A was beginning to use the beater to make a variety of non-musical hand movements in the air. While he was doing that, he intently monitored what the therapist did, and the therapist mirrored his gesture with her own beater. There were prolonged eye contacts between them. Soon A resumed the drum playing. A initiated more gestural playing either during, after or in connection with the music making processes in the following sessions as well. As cited in Chapter 3.5.2, movement, gesture, or facial expression not only became 'just as fundamental to the interaction as the musical figure' (Holck, 2004b), but is also often interwoven into the musical elements of the interaction between the child and the therapist. However, specifically the gestural part of initiation of interaction was only observed when the child formed a good level of musical communication and relationship with the therapist in this study.

Strengths and weakness: As the trials progressed, both his strength (potentials for initiating) and weakness (autistic pathological features in his playing) became evident. For example, on the one hand, A was more able to initiate a new way of playing spontaneously such as conducting a game of ‘stop and play’ with the therapist. On the other hand, he showed some repetitive and obsessive behaviours such as dismantling the xylophone, an obsession with ‘holes’ in the instruments, and his own ritual and order of playing.

Commonly observed defensive behaviours: The issue of “control” became a quite significant feature in his sessions as the trials progressed just like most of other children in this study. On the one hand, it seemed that he was able to interact with the therapist quite well when the interaction was initiated by him (mostly in the first half of the session). On the other hand, when the interaction was initiated and modeled by the therapist (mostly in the second half of the session), it became evident that he complied the therapist’s request at most only a few times, provided that the therapist’s request and direction was interesting to him and well within his tolerance level. However, A often displayed anxious and evasive behaviour toward the therapist’s initiation of interactions, directions and suggestions. This type of behaviour was mostly evident during the turn-taking activity initiated by the therapist in the second half. For example, during the 8th session, he played his turns longer and left few gaps for the therapist to play, often rejecting the therapist’s suggestion to play in turns by saying “put it away”. When the therapist demanded a little more of the turn-taking activity, A frantically pointed to something else saying “this”. Delayed and evasive reactions, refusal and re-direction to interpersonal demands made by the therapist in both conditions are frequently observed among children with ASD and was noted in A’s sessions during the second half of each session in these trials. However as each session progressed, his compliant responses increased as was demonstrated in the data presented in Chapter 5.6.3.2.1.

Joy, anticipation and motivational factor in music therapy: Overall, he appeared to enjoy musical interaction with the therapist a lot. His mother reported to the therapist (the author) that he asked for music therapy quite often during the week by saying, “let’s go to music therapy” and became frustrated when he had to wait. From the 8th session, he also expressed his fondness for the therapist. His mother became amused by his extreme fondness for music therapy and the therapist. His mother once asked him in front of the therapist, “who do you like the most?” and then A answered “Sunsangnim¹³”, meaning the music therapist. Both his musical and verbal expression

¹³ The literal meaning of ‘sunsangnim’ is ‘the one who did it before us’. This is a respectable way of

and responsiveness increased. For the last session, both his mother and his father visited the clinic with A and expressed how pleased they were with the overall development of their child.

6.1.5.2 Free play

Repetitive solitary toy play: Child A showed a lot of interests in toys during free play sessions. His spontaneous choices alternated between the dollhouse and mini cars including a dump truck and bulldozer. He played out a ‘ding dong’ game repeatedly throughout the 12 sessions. This ding-dong game consisted of a doll going in and out of the dollhouse repeatedly. Then he would suddenly go down to the floor and push the mini cars back and forth. It seemed that when he was very absorbed his own toy playing, whatever the therapist said, did, suggested, or demanded, it was hard for him to respond and to include the therapist in his play. In the second session during the second half when the therapist persisted on having her turns with the mini cars (rolling the car back and forth activity), A suddenly burst into tears shouting, “don’t ! don’t!”, and refused to give the therapist her turn.

The development of play: The therapist sensitively responded within the context of A’s play and focus of attention often just observing and commenting what he was doing and then trying ways to join with him. A became gradually more able to respond and to let her join his play. His ‘ding dong’ play theme began to vary from mere ‘going in and out of the house’ into ‘mummy going to market’, ‘mummy going to sleep’, ‘meals at table’. From the 4th session, a new character appeared in his play that he called ‘friend’. Even in his repetitive and ritualistic play, some part of the real world he experienced seemed to have been reflected. His mother confirmed that at that time, he had a sympathetic friend (a girl one year older than him) from the church, who often visited him on A’s mother’s request. Even though he was not able to play with his peers, he appeared to be interested in this girl and began to call her ‘friend’.

Commonly observed autistic behaviours: The therapist also introduced fruits made of wood, play dough and a Piccachu top. With such interesting toys, when the therapist modeled play activities, his response was immediate. However, he tended to play and explore those toys alone rather than share them with the therapist. His response to the second half of the session where the therapist gently introduces structure was quite similar to the music therapy condition. He tended to play his turn longer, and was not willing to give the therapist’s turn.

addressing a teacher, or professor. In Korean culture, the therapist is also addressed in the same way.

A's mother appreciated the value of the free play session where A developed some capacity for a basic level of symbolic play. She was also quite concerned about the repetitive and obsessive quality of his toy play throughout the session, which was more pronounced in the free play session than the music therapy session.

6.1.6 Postlude

After the trial was over, A continued with music therapy for only one month due to his mother's second pregnancy. A was also well integrated for the first time to the mainstream kindergarten near his house. The parents were hopeful about his overall development and reported positive enthusiasm with the results of total eight months of this clinical trial.

6.2 Subject B

6.2.1 Case information

Table 6.5 presents the case information of subject B, who was a verbal, high-functioning autistic boy.

Table 6.6 Case information of subject B

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
B	1	3.11	Mild	V	32.0	63	89.0	NT	N	L	1/Ab

6.2.2 Early history and concerns of the parents

Child B was the second child in the family and had a 10-year-old brother. B's physical developmental milestones were faster than the normal range (walking at eight to nine months). As a baby, B did not babble and never played peek-a-boo, but rather tend to smile alone without apparent reasons. About his 2nd birthday, his maternal grandmother raised her concern because of B's lack of response to interpersonal demands, but B's father insisted there was nothing wrong with B by pointing out a resemblance to his own childhood. Before the age of three, B began to read letters in both Korean and English. At the age of three, he went to the kindergarten and his aloofness became more obvious. At 3.2 years old, B and his mother visited the child psychiatry department at SNUH and B was clinically diagnosed as autistic. His mother enrolled for two months in a 'mother-child attachment promotion programmed' at SNUH and was then referred to this study by the staff at SNUH.

During the first interview in the clinic, B mainly wandered around the room

from wall to wall. B hardly made any eye contact with his mother, or with the researcher. There was hardly any vitality in his facial expression or his movement. Whenever the mother and the researcher tried to make some contact, he slipped away¹⁴. At one point, he picked up the egg shaker and said “egg” in English. The researcher noticed that B knew many words from the vocabularies to a more advanced level than his own age both in Korean and English. However he seemed unable to answer simple questions, or converse with other people.

Just before the commencement of the music therapy trials, B’s mother had the evaluation interview with a teacher in special education who had seen B for four months. The teacher told the mother to prepare for the worst that B might not be able to communicate and interact with people, nor recognize others’ feelings and mood states. The teacher also informed her that the special education team was not able to set clear educational goals for B at that time due to his lack of responses. The same teacher completed the PDDBI and wrote short notes regarding B:

“B plays alone most of the time and never participates in group activity though he watches others at a distance. B does not care for external environment or people, but gets very upset if his own rules and rituals were disrupted by people. During lunch and dissert time, B does not use his hands with spoon and fork, but eats well when the teacher feeds him...”

Therefore at the initial point of these clinical trials, B’s mother was quite pessimistic about B’s future.

6.2.3 Relevant background information about the mother and the family

B’s mother was very eager to talk not only about B, but also about many details of everyone in the family. She often sought private consultation with the researcher, which gave the researcher the feeling that the mother was using the researcher somewhat like her own therapist, although not intentionally. As B’s mother observed every session, she often commented that B looked like a totally different child in music therapy. B made a good improvement during music therapy and this will be described in 6.2.6. His mother was very moved by the way the music therapist worked with B and mistook this as a sign of B being a normal child, and that her inadequacy as a mother caused his autism. After finding out about Asperger’s syndrome, the mother confided in the researcher that she recognized characteristics in herself. The father remained in denial of autism in B throughout the trial and after the

¹⁴ ‘Slipped away’ is a term referring to either a physical or mental behaviour where the child moves away from what the therapist intends to engage them in. This is often quite a subtle behaviour to avoid the situation.

trial.

6.2.4 Results from the analysis of pre, in between and post treatment measures

6.2.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.9 presents social approach scores of PDDBI measured by the mother and the professionals.

Table 6.7 B's PDDBI-social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>	<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>
B	1	44	82	53	31	53	61

The scores of the mother seemed to reflect not only her identifying improvement in B, but also her unrealistic hopes (after music therapy; in between music therapy and free play) and inevitable disappointments (post free play) at the end. The professionals' scores were measured by teachers in special education. Both B's mother and the teacher identified more improvement after the music therapy condition than with the free play condition.

6.2.4.2 Early Social Communication Scales (ESCS)

Table 6.10 presents sub-scales of the ESCS scores of B.

Table 6.8 B's sub-scale scores of the ESCS

<i>NAME</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
B	I	Pre MT	1	0	3	1	1	0	0	3	7
		In between MT & FP	2	0	6	7	2	0	0	3	6
		Post FP	0	0	4	7	0	2	0	0	2

Improvement in IJAL, RJAL, RJAH and ISITt are pronounced in the music therapy condition. Compared to other high functioning autistic children, B did not make much spontaneous eye contact in joint attention situations in the ESCS tests. Some sub-scale scores showed regression after the free play condition. The implication of these findings will be fully discussed in the discussion section.

6.2.4.3 Mother Play Intervention Profile (MPIP)

Table 6.11 presents MPIP scores of B.

Table 6.9 B's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
B	1	Pre MT	M	N	N	N	N	N
		In between MT and FP	M	M	N	M	N	M
		Post FP	M	M	N	M	N	M

The scores from the mother represented how she changed her attitude towards B. For the first data collection, his mother played a cartoon on the video for B to watch while she did the housework. She did not even try to interact saying “B does not play with me and this is how we are at home. I don't want to pretend I can interact with B”.

In the second data collection (After music therapy), B's mother brought out Lego blocks and actively initiated and directed B what to do. While she became very motivated to interact with him, her timing and sensitivity to ‘reading’ the child's behavioural cues were mismatched most of the time.

During the third data collection (after free play), his mother was not only directive, but also quite moody often-interrupting B inconsistently to the point that B became very irritated and upset by her. When B pushed the mother and wept, the mother looked quite puzzled.

6.2.5 Session data with clinical vignette: Music therapy vs. free play

B showed a remarkably positive response to music therapy and a good response to the free play condition.

6.2.5.1. Improvisational music therapy

Characteristics of B's early sessions: From the first session, it was obvious that music therapy worked for him. During the first session, B sensed that the therapist's matching music was related to whatever he did in the session. This seemed to give him such a good feeling about the music and the therapist. His physical distance from the therapist was kept quite far in the beginning, and then about half way through the session, he approached the therapist and began to rub his head and then the body against her body. Eventually, he sat down on the therapist's lap. It actually looked quite similar to the approaching behaviour of pet cats to humans. This reminded the researcher of the motivational conflict theory concerning approach and

withdrawal behaviour of autistic children (Tinbergen and Tinbergen, 1985). Towards the end of the first session, the researcher noticed during the video analysis that B said to himself, “I feel good” in a whispering voice.

B’s liking of music therapy and the therapist: Before the second session, his mother reported that there were already noticeable changes in B since the first session; such as increased interest in his peer group, watching what the children were doing, and spontaneously saying ‘hello’ for the first time. His mother told the researcher about an incident on the way to the clinic in the subway. B began to throw a temper tantrum when the mother made him stay in the train while the train was passing the station where their home was. B’s mother told him “let’s go to music and play the harp” upon which he immediately calmed down. According to his mother, he disliked going to early intervention programmes. B also showed a liking for music therapy and the therapist as time went on.

B’s observation of the therapist and playing out the therapist’s role: B not only interacted with the therapist musically, but also observed how the therapist responded to him. For example, earlier period in music therapy, B played the Nordoff-Robbins horns and the therapist played the piano. When the therapist suggested playing the horns once more (during the second half of the session), he walked passed the therapist, leaving the therapist with two horn in her hands, and then went to the piano. With anticipatory looks on his face, he waited in the same way the therapist waited for him. When the amused, perhaps a little surprised therapist began to blow the horns in turns, he imitated the therapist by playing two notes on the piano high and low in the same order as the therapist’s two notes on the horns although the notes were not exactly the same. His intention to imitate what the therapist did was clearly present. This event reminded the researcher of the extreme male brain theory by Baron-Cohen (2003) as described in Chapter 2.1.2., pointing out the strong drive to systemize and find rules when dealing with natural phenomena. It seemed B found the rules for interaction with the music therapist and took charge of those rules himself.

Development of self-expression, joy and relationship: His musical and verbal expression increased rapidly with a lot of spontaneous eye contact, joy, and emotional synchronicity events. After the 4th session, he said to himself “well done, I well done” and approached his mother and said for the first time “mummy...like you” that made his mother cry. It was a very touching moment.

Development of attachment in a therapeutic relationship: When B and the therapist stayed physically near to each other, B often put his feet onto the therapist’s feet or lap. The therapist did not feel comfortable with this physical contact and at one time she

removed his feet from her lap. B looked rebuffed and immediately looked away. It should also be noted that B sometimes called the music therapist “mummy” during the music therapy session, typically when there was an active mutual music making process. This also happened with other children in this trial where the children called the music therapist “mummy”, but yet they never did anything like that to the therapist in the free play condition. The implication of this will be discussed in the Chapter 7.

Development of gestural interaction: The development of interaction over time was quite similar to Child A. B began to also initiate interaction through gestures from the 6th session and gestural interactions were in connection with musical interactions.

Commonly observed defensive behaviours: The issue of control was also evident in B’s sessions. Whenever something was initiated by B, he appeared to be quite happy to interact with the therapist within his own attention span and tolerance. However, when the therapist initiated with the intention of introducing a structure (during the second half of the session) even with the same type interaction using the same instrument he had previously enjoyed and engaged with, B’s reaction was qualitatively different. He would respond for a shorter duration and with less enthusiasm, delay the response, passively avoid it, or initiate something new rather than following what the therapist had asked. B did not show as much anxiety when the therapist initiated during the second half of the session like A. It was rather that he blocked opportunities for the therapist to take charge of what happened between them. For example, during the turn taking when the therapist announced that it was her turn, he interjected his turn and played longer than usual with what appeared to be little troubled looks on his face.

Eye contact in the early phase of music therapy: As musical interaction progressed, it was evident from the early session analysis that he made more frequent eye contact when he was playing instruments far away from the therapist (typically when he was on the drum and cymbal, and the therapist on the piano). This was true with most of the children especially in the earlier phases of music therapy in this study. As the sessions progressed, children were able to make spontaneous eye contact regardless of physical distance from the therapist when they enjoyed the interaction. When the children displayed a lot of joy (smiling and laughing), there were more spontaneous eye contacts and initiation of engagement with the therapist than when there was no joy noted.

Last phase of music therapy: Towards the end of therapy sessions (from the 10th session onwards), B also displayed ‘naughty’ behaviour. He would play the drum with the beater, but did not hold the beater tightly enough and the beater flew out of his

hand. B did not respond to the therapist's warning to stop, as he found it amusing. B laughed hard each time, and on one occasion he hit himself with the flying beater.

His good development during the music therapy condition was noted by the teacher in special education, by his mother and by the research team. His mother said;

“B looks almost normal in music therapy. His behaviour improved at home and at pre-school in special education, but not to the same degree as in music therapy. I think B met the wrong mother”.

Even though the researcher assured B's mother that she was doing better than before and we, the professionals, are trained to help children like B, it was obvious that his mother was still blaming herself for being an inadequate mother.

6.2.5.2. Free play

Characteristics of toy play: B played with the dollhouse throughout the session. And yet there were repetitive qualities in his doll play; it was also obvious that the doll house play became a space for him to play out his own issues concerning his family. At the beginning of the free play trial, B's mother also sent him to the mainstream pre-school.

Entering upon the toy area, he immediately went for the dollhouse and absorbed in his own world. He vocalized “hmn, hmn....umm...” while he was manipulating the dolls. However whenever the therapist tried to join him, he walked away or destroyed whatever he was doing. Therefore, the therapist allowed his own space to play, while she simply observed and commented on what he was doing. When the therapist began to comment on what he was doing with rhythmic intonation such as “oh, it's drop~ed, koong”. He seemed to listen and imitated verbally the last word of her sentence “drop~ed”. More spontaneous verbal imitation occurred therefore throughout the free play session. Half way through the session, he was playing with adult dolls. He began to drop the ‘female adult’ doll from the second floor to the ground floor. When the therapist responded, “oopsy, it fell down”, he laughed hard and repeated this many times. About the end of the first session, B said “coward....coward family” in a whispering voice alone.

Commonly observed defensive behaviours: The issues of control and preparedness to share were more pronounced verbally and behaviourally in the free play sessions. He became very unhappy when the therapist tried to structure the session even with the toy materials with which he previously played so well with the therapist. For example, he enjoyed setting up the table in the dollhouse. However when the therapist tried to join him by turn taking, he destroyed the table and sometimes said, “hate”. B was

extremely territorial and had no intention to share his toys with the therapist.

Musical and gestural interaction developing in free play: As session went on, B very gradually began to let the therapist join in his toy play. The 5th session was a break through in therapeutic terms. B let the therapist join his table setting play and after the table setting, the therapist modeled by feeding the dolls and making delicious sounds and gestures with her voice and face. B too, got interested and pretended to feed the ‘dog’ and the ‘dolls’, and then turned to the therapist and made a feeding gesture with a tiny little spoon. As the therapist made corresponding sounds of eating, his gesture and speed varied. A lot of spontaneous eye contact, joy and emotional synchronicity occurred through a somewhat musical-gestural interaction. He also initiated an ‘injection game’ with the therapist where the therapist made a sound of playful fear and pain “ah-ya..ah-ya..”. He alternated between feeding and injecting the therapist and this play was repeated many times till the end of the free play trials. As session progressed, B showed certain attachment behaviour towards the therapist and occasionally addressed the therapist “Jinah Kim Sunsangnim”.

Difficulties played out: His conflicts with his mother continued outside of the therapy and were reflected during his doll play. He often cruelly treated the female adult doll by dropping from a high place to the ground, or by hitting it with a car. One time when the therapist asked who it was, he replied “mummy”.

Also from the 8th session, the therapist began to address the impending end of the trials. Every time she addressed how many sessions were left, B went down to the floor and obsessively played with the bulldozer, repeatedly digging the ground. He turned his back on the therapist, kept his distance from the therapist. When the therapist talked about how hard it was to say good-bye and how hurtful it was, B appeared to listen. Then, B approached, tried to lean on and find a comfortable place on the therapist’s body by locating himself in her. At the 11th session he came in crying. His mother told us that he was fine until he got on the elevator. The moment he entered elevator of the building where the clinic is located, he began to cry. However, when the therapist announced that after the trial they are going to see each other again. His facial expression brightened and he began to play with the doll making a flying gesture with his hands. The therapist commented, “the news makes B feel like flying”. He listened what was being said. The last session, however, he was in a bad mood. The contents of his play was quite disturbing and clearly seemed to express something; the dolls were flying and head banging at the wall; the dog was stamped on repeatedly by the family; dad and mummy dolls were falling down repeatedly from the top of the house.

Later B's mother informed that she gave him physical punishment from time to time and it happened just before coming to the therapy that day because he did not do what she told him to do. After the music therapy trials, the researcher noticed that his mother treated as if he were a normal child and actually demanded that he behave as such. She then became very frustrated that B did not behave like a normal child. The three months of trial at the mainstream pre-school turned out to be traumatic experience for both of them; B's behaviour regressed. He usually went to the corner of the room and curled his body up almost in a foetal position during the class. He displayed idiosyncratic hand movements, which he used to show previously. B also began to hit children, who approached him. He became not only an autistic, but also a problematic child at the pre-school. His mother however acknowledged that both free play and music therapy worked well for B and each condition had its own value.

6.2.6 Postlude

B completed the clinical trial within seven months. The mother wished to continue and yet has continued for less than a month since the father objected to further therapeutic interventions. In her desperation, his mother visited the clinic a number of times for more consultations. In the end, she decided to follow her husband's decision and never returned to the clinic.

6.3 Subject C

6.3.1 Case Information

Table 6.10 presents the case information of child C, who was a non-verbal, low functioning autistic boy.

Table 6.10 Case Information of subject C

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
C	1	3.11	Severe	PV	36.0	NT	78.0	NT	N	M	1/Ab

6.3.2 Early history and concerns of the parents

Child C was a second child and had a seven year old brother. His physical developmental milestones were generally delayed (walking at 19 months). The mother reported that he spoke the first words 'car' around 14 months, but did not develop any language after that period. Due to the lack of response to people and language delay, his mother visited the child psychiatry department at SNUH and had a diagnosis of

autism at the age of 2.6 years old. After the diagnosis, C attended the mother-child attachment promotion programme with his mother for five months at SNUH where C was referred for this study. After the first diagnosis, his mother was determined to help C as much as possible by enrolling him in many therapy programmes. When the researcher had the first interview with C and his mother, C was receiving seven different types of quite intensive interventions at an early intervention center near the clinic. C was a hyperactive child with an extremely short attention span and had shown patterns of insecure attachment behaviour with his mother. Even during the interview, C was very anxious and controlling as evidenced by his behaviour towards his mother whom he would cling to and not allow taking off her jacket.

6.3.3 Relevant background information about the mother and the family

C's home is located about two hours drive from Seoul in Incheon city, and the mother was the main caretaker as was the case in most of subjects in this research. His mother was quite capable of playing and engaging C at his own level. However, she told the researcher that she had a rather volatile personality that she found it hard to be consistent with C. The mother has shown trust in the researcher as a professional and was eager to offer as much relevant information as possible about C.

6.3.4 Results from the analysis of pre, in between and post treatment measures

6.3.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.11 presents social approach scores of PDDBI measured by the mother and the professionals.

Table 6.11 C's PDDBI-social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>	<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>
<i>C</i>	1	49	48	44	28	37	41

While the scores of the mother became gradually worse over time, the scores of the professional (speech therapist) gradually got better. Regression after music therapy was less pronounced than after free play condition in his mother's scores. Improvement after music therapy was more pronounced than after free play condition in the professional's scores. The mother observed all sessions throughout the trial period and C did not respond well to both conditions. Therefore her scores are understandable. This will be explained further in 6.3.5.

6.3.4.2 Early Social Communication Scales (ESCS)

Table 6.12 presents C's sub-scale scores of ESCS.

Table 6.12 C's sub-scale scores of ESCS

<i>Subject</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
<i>C</i>	<i>I</i>	Pre MT	4	0	1	1	0	1	0	3	0
		In between MT & FP	15	0	2	3	0	0	0	2	2
		Post FP	10	0	3	2	0	0	0	2	0

Table 6.12 shows marked improvement in the IJAL, RJAH and RSIH sub-scales after music therapy condition and slight regression after free play condition. The changes of other sub-scales scores were minimal compared to these. ESCS scores correspond to the professional's PDDBI scores more than the mother's score in PDDBI. There was more improvement after music therapy than free play in regard to joint attention ability in this study.

6.3.4.3 Mother Play Intervention Profile (MPIP)

Table 6.13 presents individual sub-scale scores of MPIP.

Table 6.13 C's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
C	1	Pre MT	M	Of	Oc	M	N	M
		In between MT and FP	Of	M	Oc	M	N	M
		Post FP	M	Of	Oc	M	N	M

The mother was capable of observing, responding and initiating play at C's level. However, as C was a hyperactive and aloof child, the mother was very active in offering and initiating structures and social cues. C's mother used a lot of physical play and singing for the first data collection (pre music therapy), soap bubble in the second data collection (after music therapy), and C's favorite toy Woody in the last data collection (after free play). Although the materials for play interaction changed, her behavioural patterns of engaging C seemed to have been established.

6.3.5 Clinical vignette with descriptive analysis and discussion

C was a very young and not very healthy child who fell sick periodically. His

mother and C traveled a long distance each day for five days (total five to six hours of traveling back and forth) to the early intervention center and came to the clinic at three P.M on Wednesday. By the time C arrived, he looked exhausted. C was extremely irritable and most of the time just wanted to go home and did not want to do anything at all. He was also attending the early intervention center where very strict behavioural modification approach was used. This center's programme was well known for its austere discipline. This was the complete opposite to 'a child centered approach in music therapy' used in this study.

6.3.5.1 Improvisational music therapy

An exhausted child: In the first session, C's attention span was extremely short that his playing of one instrument lasted mostly less than 10 seconds, and was hardly ever more than 30 seconds. He seemed to lose interest quickly and constantly tried to open the door and to get out. In order to keep him in the therapy room, the therapist had no option but to lock the door. He became very upset about this and thus became more obsessed with the doorknob. Because of this type of behaviour, the therapist had to be more active initiating and offering what might be interesting to C even in the first half of the sessions.

Description of typical behaviour in sessions: Throughout the sessions, there had been a struggle between C and the therapist as C continuously tried to get out. He explored and played some musical instruments mostly alone and was very territorial about his objects. He was extremely autonomous and showed a strong negative reaction when the therapist tried to join in or structure the session either through modeling or turn taking. When the therapist intervened, he slipped away, or screamed in protest. After the first session, the therapist was very stressed out due to her struggles with C. However, his mother said it was unusual that C was able to go in anywhere by himself without his mother. With other programmes, he tended to cry a lot and took a long time to settle down.

Development of vocal exchange: In the 4th session, he was interested in playing the handbells not in a musical way, but in his own idiosyncratic way. He set the handbells in line and pushed them all down with his feet. He did this repetitively. Each time he pushed them all with his feet, he made a "wow" vocalization and gestures as if he defeated something. Therefore, the therapist matched his gesture through her vocalization and moved with him.

As sessions went on, his vocalization increased and it was possible to have a vocal exchange in turn-taking form with him. Active vocal exchange was often

observed between non-verbal, low-functioning autistic children and the therapist in both conditions, but not seen often with verbal children. This type of vocal exchange did not appear to be fully intentional, or conscious, but rather showed a passive joint engagement state that was described in chapter 2.3. Vocal exchanges between C and the therapist developed well throughout the session. Yet with instruments, only a very short interaction and engagement occurred between them.

C's distress and self-harming behaviour: In the 8th session, C found a 'Woody' doll in his mother's handbag by accident, but soon his mother took it away from him since she knew if he was allowed to play with Woody, he would hardly respond to anything else. He became extremely upset, threw a long and persistent temper-tantrum and cried uncontrollably. However, even through his crying, a vocal exchange between C and the therapist occurred as the therapist tuned into the rhythmic, dynamic quality of his vocal expression and responded accordingly. Since he was not given Woody back and was prevented from going out, he showed self-harming behaviour in the beginning of the second half of the session by putting his fingers deep in his throat. This behaviour was not new to the therapist (the author) and had been previously observed in other autistic children in deep distress. Therefore, the therapist prevented C from trying it again and ended the session earlier due to the level of distress shown by C.

Overall reflection: Overall, C was a quite difficult child to deal with. C was not only too tired to do anything, but also the therapist felt that he did not respond well to this type of gentle child-centred approaches. For example, when the therapist approached him in a gentle manner, he hardly responded. He responded, however, when the therapist raised her voice in a strict and authoritarian manner and gesture. It seemed that a gentle, non-directive approach was not a strong enough stimulation for him to respond to since he was accustomed to a more austere disciplinary approach in the center he attended. Overall, C showed some improvement (i.e., increased vocal exchange), but his improvement was quite minimal compared to other children.

6.3.5.2 Free play

Male therapist and favorite toy 'top': C's mother informed the researcher of his fondness for adult males, even strangers such as the postman. Therefore, the music therapy graduate student (the research assistant who was a social worker and had some experience with children with ASD) took the role of the therapist. By this time, he had been assisting the research for about six months and was familiar with the principles, procedures and styles of both conditions. C's mother also informed about

his favorite toy ‘top’, which the student therapist used quite well.

In the first session, as his mother predicted, C responded affectionately to the male therapist in free play sessions in a good mood. C soon spotted tops in the shelf and tried to get them by climbing onto table. Throughout the 12 sessions, he showed much interest in tops. He was very skilled at playing with the top with his hands, and was able to play it better than the therapist. The top he was playing was not the level of such young child like C and it required a certain level of hand dexterity. His mother informed the researcher that when C saw his brother playing with tops, he became fascinated with this spinning object and practiced endlessly until he reached his current level of skill. The fascinations with spinning objects are often observed behavioural characteristics of children with ASD.

Vocal exchange: When he was in a good mood with spinning tops, he vocalized a lot and there were prolonged vocal exchanges between C and the therapist as well. As described before, this did not appear intentional, but rather unintentional and passive joint engagement with the therapist.

Development of turn taking through ‘spinning’ play: When he played with the spinning top, he was very absorbed by it, and not able to respond well to anything else in the early stages. However, when the therapist also practiced and reached a level approaching C’s, C began to show interest in the therapist’s playing and soon he gradually was able to follow the therapist’ suggestions and directions in the second half of the session. When the therapist suggested playing the top in turns, he was able to wait for his turn and watch how the therapist played. However, when the therapist did not play very well, he went away.

Last phase of free play: His obsession with the top began to wane as the end of the session approached. Although less frequently than in the music therapy condition, he wanted to go out and often clung to the doorknob. The therapist introduced wooden fruits, mini cars to which he responded after a little while. Overall, C showed much more prolonged attention span when he played with the tops. Although the spinning play had a somewhat obsessive quality to it, C showed some development in the area of social interaction such as turn taking with the therapist using the tops.

6.3.6 Postlude

Throughout the eight months trial, it was obvious that C could not digest the intensive schedule that his mother imposed on him. First, the researcher discussed with the mother the necessity of prioritizing intervention programmes to C’s

individual level, and second about the long-term negative effects of the austere disciplinary approaches used in the centre he attended. The researcher found that it was somewhat draining his own motivation in social interaction and drove him further into his autonomous state. The researcher also emphasized that it would be better to find a programme near their home. Eventually C's mother stopped attending the early intervention center and enrolled C in a small private nursery near their home. The mother informed the researcher that little by little C adjusted well to this local nursery. The nursery teachers were not trained professionals, but sympathetic to and caring toward C. Most of all, C began to eat carrots and cucumbers for the first time at the nursery and that made his mother content.

6.4 Subject D

6.4.1 Case information

Table 6.14 presents the case information of subject D, who was a non-verbal, low functioning autistic boy.

Table 6.14 Case information of subject D

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
D	1	5.03	Severe	PV	38.5	47.4	NT	C	Me	M	1/Ab

6.4.2 Early history and concerns of the parents

D was the second child in his family. His older brother was a seven year old boy. His milestones of physical development were well within the normal range. His mother did not notice anything strange until D reached 30 months old. She said that he used to speak a few words. However, by 33 months he did not sleep, nor speak. He was prescribed Risperidone, an antipsychotic drug that had a calming effect on behaviour (Green, 1991). He loved spinning himself and watching objects spinning, or watching the computer screen displaying fast moving letters. He was unusually frightened by loud noises. D was diagnosed as severely autistic at SNUH and attended two months of the mother-child attachment promotion programme at SNUH from where he was referred for this study.

6.4.3 Relevant background information about the mother and the family

The first impression of his mother was that she looked hollow and exhausted both in a physical and a psychological sense. She visited the clinic with her two sons

for the first interview. The older boy was extremely demanding and showed an insecure attachment behaviour by constantly clinging to and frantically seeking his mother's attention in a hyper active manner, while the younger boy (D) had a hollow quality similar to his mother's to him. While the older brother literally occupied his mother, D wandered around the room. The researcher could not do the interview since conversation with the mother was impossible, as the older child did not let them talk. D did not seek his mother or his brother, and was constantly moving around, sucking his hands and climbing to the top of the piano. When D touched the small ocean drum, his older brother immediately took it away. D walked away and did not protest. The mother said that she used to be outgoing and an extrovert, but that all changed after D's diagnosis.

6.4.4 Results from the analysis of pre, in between and post treatment measures

6.4.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.15 presents D's social approach scores of PDDBI.

Table 6.15 D's PDDBI-social approach scores

Subject	Group	Mother			Professional		
		<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>	<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>
<i>D</i>	1	52	60	66	26	28	47

The pattern of each measure differs between the mother and the speech therapist. There was slightly more improvement after the music therapy condition than after the free play condition in the mother's score. There was a small improvement after music therapy and then a marked improvement after free play in the speech therapist's score. The speech therapist opened her own clinic about the same time the researcher sent the PDDBI for the in between measurement, and then did not return the form for almost two months. When the researcher sent her another form for the last measure, she completed and returned the form immediately.

6.4.4.2 Early Social Communication Scales (ESCS)

Table 6.16 presents D's sub-scale scores of ESCS.

Table 6.16 D's sub-scale scores of ESCS

<i>Subject</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
<i>D</i>	<i>1</i>	Pre MT	2	0	4	2	0	0	0	0	1

		In between MT & FP	3	0	4	2	0	0	0	3	2
		Post FP	3	0	0	1	1	0	0	4	2

The sub-scales scores of ESCS generally show little improvement or no improvement after music therapy and either no improvement or slight regression after the free play condition. ESCS scores are more corresponding to the mother's score in PDDBI rather than the speech therapist's scores in PDDBI.

6.4.4.3 Mother Play Intervention Profile (MPIP)

Table 6.17 reports MPTP scores as follows;

Table 6.17 D's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
D	1	Pre MT	M	M	N	M	N	M
		In between MT and FP	M	M	N	M	N	M
		Post MT	M	M	N	M	N	M

The intervention style of the mother during the home based free play with D was consistent throughout the three 'pre, in between and post' measures. As D typically did not seek interaction with his mother, his mother usually got hold of D physically and initiated physical rough and tumble play. D laughed a lot when the mother manipulated his body in playing, but soon slipped away and went in the corner of the room on his own. Then his mother usually brought his favorite puzzle and initiated puzzle play. D responded puzzle play for a short moment, and then slipped away again.

6.4.5 Clinical vignette with descriptive analysis and discussion

The analysis of the sampled video data demonstrated that when analyzing joint attention and social interaction behaviours, D responded to music therapy very well and less well to the free play condition.

6.4.5.1 Improvisational music therapy

D's mother's concern: On the first day, D's mother looked worried and was quite apologetic saying, "D has a very short attention span". The therapist had the

impression that the mother was trying to warn her that she probably would find it very hard to interact with D because most people had that experience.

Spontaneous responsiveness to music therapy: In contrast to his mother's concern, D came in and was interested in the chroma harp that the therapist used to greet him. He explored the harp by touching, strumming, scratching and responded to her occasional modeling (a different way of playing from him) quite well.

D's idiosyncratic traits: D had his own idiosyncratic traits, such as his typical vocalization "Oi, Oi, Oi" and hand sucking behaviour throughout the music therapy trial. Unlike other children, who suck one or two finger, he sucked almost a whole hand. Therefore his hands were almost always covered with saliva and this became quite an issue for the therapist (the author) to deal with therapeutically. This will be elaborated later.

Commonly observed defensive behaviours: He alternated between spontaneous instrumental playing and wandering off producing a lot of vocalization "Oi, Oi". He responded very well when the therapist introduced Nordoff-Robbins horns, and was able to spontaneously take part in turn taking during the second half of the first session. The issue of control was also evident in D. He would usually respond well to turn-taking either vocally or instrumentally, when there was only non-verbal cueing was offered by the therapist. However, when he was verbally demanded to perform his turn like "it's D's turn" or "it's Sunsangnim (meaning the therapist) turn", he delayed his response, or did not respond at all. Whenever there was a sign of the therapist making interpersonal demands verbally, he either grimaced, or slipped away. This clinical finding is congruent with the brain research reporting abnormal processing in the socially relevant auditory brain region of autistic individuals so that people with autism fail to respond to the vocal, or speech like sound of humans (Boddaert et al, 2003; Boddaert et al, 2004; Gervais et al, 2004). This will be elaborated and speculated upon further in the discussion section.

Initiation of melodic turn taking: From the 4th session, D occasionally approached the therapist who was at the piano. He played a descending melodic line 'C, B, A, G, F' with his fingers. Since this was similar to the famous tune 'Fallen leaves', the therapist played 'B, A, G, F, E', then he played in turn 'F, G, A, E'. When the therapist continued in responding, he went away. Therefore, the therapist once more played the tune and sang "D is here and D played the piano with me". D returned and made another melody on the piano. Considering the researcher's clinical experience with autistic children, it was rare to encounter a young, low-functioning autistic child spontaneously initiating melodic turn-taking interaction. As the session progressed, he

occasionally re-approached the piano with this tune and initiated short turn taking with the therapist. This event had a mysterious quality about it.

Saliva problem: His compulsive sucking of his hands was a big problem for the therapist (the author). Whenever he played instruments, saliva was smeared all over the instruments, and also on the therapist. The therapist found it necessary to continually clean up saliva traces with tissues and also to use disinfectant after each session with D. At times perhaps, she was quite preoccupied with cleaning first rather than interacting with D. The therapist was not very conscious about her own reaction until she saw herself on the DVD and his reaction to it. The moment the therapist picked up tissues, he slipped off and his facial expression became somewhat rebuffed. The therapist remembered some cases of children with severe learning difficulty where smearing their saliva was a way of leaving their own ‘traces’ in a primitive way. The therapist also began to observe how his mother was also compulsively wiping of saliva from his hands in the clinic. The researcher would not go into how she interpreted this phenomenon. However, when the therapist became fully aware of what was going on, she was no longer driven to wipe off his traces. She let him leave his marks in her instruments and on herself. The therapist also advised the mother not to wipe his hands too often and explained the reasons for it.

Reuniting: After the 4th session, the therapist met D after a two week break, and he displayed unusually distressed behaviour whereby he threw a temper-tantrum, pinched the therapist on the face and lay down down on the floor in distress. When the therapist acknowledged how he might feel upset at the break, he expressed more of these emotions, suggesting interpretations of abandonment and being forgotten

Development of complex interaction and joys: D began to enjoy new instruments, crow calls, sliding whistles over the following weeks. During the course of therapy, interaction became more complicated. For example, he moved around in harmony with the therapist’s playing and singing, and he responded to the songs such as “where did D’s hands go?” and simultaneously took his turn with in vocalizing with the therapist. In the last session, D played the fallen leaves again.

Initiation vs. being initiated: With turn-taking activities, it was obvious that when he initiated, he was able to take a part in turn taking for a longer duration whereas when the therapist initiated, he was less able to do so and often slipped away, especially when she made verbal demands.

Overall development: At the 12th session, he sucked his hands far less and it was no longer a concern for the therapist or for his mother. The duration of the musical engagement between D and the therapist gradually increased throughout the 12

sessions (as demonstrated by the duration of musical synchronicity and turn-taking). The mother acknowledged the positive effect music therapy sessions had on him.

6.4.5.2 Free play

Autistic aloofness in toy play: D liked the play materials and the therapist. However like other autistic children with toys, his autistic tendency became more pronounced than in the music therapy sessions. In the first session, he went to the Lego blocks. He repeated building the blocks, destroying the blocks and rebuilding them again. Then he lined up the blocks on the floor. Whenever the therapist tried to join him, or structure the play, he tended to walk away. It seemed he had his own plan of how to play with those toys and the therapist's intervention somehow disturbed his own plan.

Spinning objects: D watched when the therapist modeled certain ways of playing with some toys, such as spinning the top. Like most children in this clinical trial, D responded well to spinning objects such as the top. He often requested the therapist to make the top spin. He also practiced with a patience that eventually he was able to learn how to manipulate the top to spin. Most autistic children in this study showed that they were motivated to learn when they were interested in toys such as the top. They also showed a much extended attention span usually not observed in other situations. This will be discussed further in Chapter 7.

Overall development: As the sessions went by, he was able to play with more toys in the free play session. He would also play with the doll's house, but in a rather repetitive way. He would open and close the door repeatedly, or make the dolls sit on chairs in line. The therapist also used wooden puzzles and normal puzzles as his mother informed that he responded well to puzzles. As session went on, the therapist also did a lot of vocal exchanges with D in turn-taking form. Although D did not respond well to the therapist's modeling and structuring, he often approached the therapist physically, climbing the therapist's back and trying to sit on the therapist's shoulder. In the last period of free play sessions, he also displayed an attachment to the therapist. When the therapist announced that they had one more session left, he wandered around the room endlessly. When the good-bye time arrived, he came and climbed on the therapist's lap and did not want to be separated. As his parents decided not to continue after the trial, it was announced as the end of coming to the clinic.

6.4.6 Postlude

The family lived at the opposite end of Seoul from the clinic. The researcher

advised D’s mother to continue music therapy and referred him to a music therapy clinic run by Nordoff-Robbins trained therapists, which is located nearer to their house than the clinic.

6.5 Subject E

6.5.1 Case information

Table 6.18 presents the case information of subject E, who was a verbal, high-functioning autistic boy.

Table 6.18 Case information of subject E

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
E	1	5.08	Mild	V	39.0	NT	64.5	NT	N	M	1/No

6.5.2 Early history and concerns of the parents

E was the first child in the family and had a year younger brother. His developmental milestones were well within normal range. He spoke his first word ‘mummy’ at eight months and began to use two words at about 12 months. The parents noticed problems with E at about 20 ~25 months of age. He did not make eye contact with people and was very obsessed with TV and video. He was also restless and easily distracted. E was diagnosed as having autism at 28 months. E and his mother also attended the mother-child attachment programme at SNUH. Since then, he received special education for about two years, and was integrated into a mainstream pre-school at the time of this clinical research. During the first interview, E displayed self-talking¹⁵ behaviour most of the time. E’s mother frequently warned him not to talk that way. The contents of E’s self-talking were apparently some sentences of the children’s book on animals and throughout the trial, E displayed an obsessive interest in animals.

6.5.3 Relevant background information about the mother and the family

E’s mother appeared as one of the most loving, emotionally healthy and stable mothers in this clinical trial. The mother told the researcher that E used to cry when his brother interrupted his own ritual, as E was hardly interested in his younger

¹⁵ Self-talking behaviour is where the child talks to himself of what he thinks, which may not be related to what is happening here and now, or the context.

brother. She mother informed me that E became more able to deal with his brother lately.

6.5.4 Results from the analysis of pre, in between and post treatment measures

6.5.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.19 shows the scores of the mother and the speech therapist.

Table 6.19 E's PDDBI – social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>	<i>Pre MT</i>	<i>In between MT & FP</i>	<i>Post FP</i>
<i>E</i>	1	41	47	62	64	65	66

The scores of the mother show slight improvement after music therapy and more improvement after free play. The scores of the speech therapist showed small changes, and no differences between conditions over all three data points. While the mother's scores reflected more improvement after free play, her comments contradicted the scores. She identified good improvements during the music therapy sessions whereas during the free play condition, E's autistic tendency became more evident, which made her very upset and worried. She also commented on the PDDBI that she did not understand well how this rating scale worked and what each part of rating scales was asking for. Only after the seven months trial was she able to understand and score well.

6.5.4.2 Early Social Communication Scales (ESCS)

Table 6.20 reports E's sub-scale scores of ESCS/

Table 6.20 E's sub-scale scores of ESCS

<i>Subject</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
<i>E</i>	<i>I</i>	Pre MT	7	4	6	8	1	1	0	0	7
		In between MT & FP	8	2	3	7	1	1	0	5	4
		Post FP	2	0	6	4	1	2	0	1	5

E's individual ESCS scores report more or less a gradual regression on scores on the whole. Scores of IJAL, RJAH and RISL reports slight improvement after the music therapy condition, and marked regression after free play. Other scores such as IJAH, RJAL, RISH report slight regression after music therapy, either more regression,

or slight improvement after free play.

6.5.4.3 Mother Play Intervention Profile (MPIP)

Table 6.21 presents E's scores of MPIP.

Table 6.21 E's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
E	1	Pre MT	M	Of	Oc	M	N	M
		In between MT and FP	M	M	Oc	M	N	M
		Post FP	Of	Of	Oc	M	N	M

Interaction between E and his mother was quite established. As E liked everything about 'animals', throughout the three data collections (pre, in between and post measures) his mother structured the sessions with animal related themes in order to get his attention. Even though E did not initiate interaction, E responded when his mother talked to, requested and directed him. Over the seven-month trial, his mother was a little more able to lower the level of directiveness in her playing with E.

6.5.5 Clinical vignette with descriptive analysis and discussion

In the sessions, E showed a step-by-step development in music therapy whereas in free play condition, his autistic tendency became more pronounced.

6.5.5.1 Improvisational music therapy

Controlling child: E was an extremely controlling child who was very resistant towards new experiences in the early sessions of music therapy. Even when he chose instruments such as horns and the therapist blew in order to show him how to play, he said "it's frightening, Mummy". In the beginning, he was not able to play anything, but he also controlled the therapist not to play. He had a short attention span and was quite restless, moving quickly from one instrument to another. In the second half of the session, if the therapist initiated modeling, or turn taking, he often initiated something else, or said again "frightening, Mummy" "stop it" and walked away.

Since he was interested in instruments, gradually he was able to explore and make some sounds with instruments. When he was able to play, it was evident that he could not tolerate any unexpected quality in the therapist's music. He would not let the therapist play more expressively, or play the piano (different instrument from him). When he sensed such moment, he would say, "stop there", or "don't do that, Mummy". The issue of control was fully evident from the beginning of E's music therapy. The

therapist had to play the same instrument with limited expressivity congruent to his way of playing.

Step-wise introduction to the new experience: The therapist was sensitive enough to work at E's level of tolerance and gradually tried expanding to new experiences. For example, in the 4th session, she suggested to play horns in the second half of the session. As usual, he immediately refused saying, "put it away". The therapist gently blew the horn and offered the horn to his mouth, and then he blew. However, he said quickly "put it away" again. The therapist suggested, "let's play once more, shall we each play with one (meaning one for him, one for the therapist – separating the instrument, however similar quality)?" The therapist blew her horn and with second horn, she gently put it to his mouth. He blew it, however frowned at first. Nevertheless a turn-taking form of interaction was established. When the turn taking was flowing, the therapist made a further suggestion "let's play with the piano". She played the piano, while assisting E by putting the horn to his lips in a turn-taking form. He then blew again as before. When this continued for a while, she suggested; "now can you blow the horn by yourself?" The result was that E blew the horn by himself, while the therapist played the piano. It was their first time playing two separate instruments and this was sensitively and gradually introduced. It was well within the limits of E's tolerance. Previously when he was encouraged like this, he used to slip away immediately. However, this time he stayed and responded to the therapist. Alvarez (1992) often emphasized the need for gently chasing the child little, and then claiming the child's attention and inviting the child into mutual interaction. This was precisely what happened in the music therapy situation.

Increased initiation of engagement by E: As the sessions went on, E genuinely started to enjoy musical interaction with the therapist. The more he enjoyed, the more he was able to initiate interaction with her. He initiated a lot of vocal exchange. He also asked for the "Elephant song" – his favorite animal song. They sang together, and then the therapist accompanied his singing with the chroma harp, the piano and the sliding whistle, which expanded his experience even more by using a number of different instruments. He was also able to subtly initiate engagement by spontaneously changing his way of playing, and monitoring her responsiveness.

Self-assuring behaviour when facing new experiences: The most remarkable development towards the end of the music therapy trials was that whenever he tried new things with the therapist, he said, "not frightening, hmm?" as if to remind himself that new experiences are tolerable and even enjoyable. He also displayed spontaneous teasing and somewhat 'naughty' behaviour. He approached the therapist and blew the

horns very loud to her ear and then he covered his ears with his hands to protect himself for the potential retaliation. At the end of this interaction, he said, “that was not frightening” in Korean and then “good try” in English. A lot of spontaneous eye contact, joy and emotional synchronicity occurred, of course.

Sometimes, both the mother and the father observed the session together. They were surprised at some of the progress E made and understood when E held back in fear of encountering new experiences. Viewing the on-going sessions through the TV monitor, we all laughed, sighed and shared a simultaneous and mutual understanding while the music therapy progressed.

6.5.5.2 Free play

E's requests and frustrations: an animal theme play and his demanding the therapist to provide what he wanted characterized the free play session. From the first session until the last session, he often demanded the therapist (the author) to make animals such as ‘Cheetah, Elephant’ with play dough and often became frustrated when the therapist could not make those animals to the level of his expectations. He would say “yes” to her suggestions to make those animals together, but he hardly tried himself. He even asked the therapist to make ‘Lepati’ and got extremely angry when the therapist could not respond his request since she did not know what it was. It seemed ‘Lepati’ was an imagined animal he saw from a children’s book somewhere. Just as is found in the theory of mind tests (Chapter 2.1.6), he assumed that the therapist knew what he knew. Even when the therapist tried to explain the difficulty, he could not hear what was being said since he was getting very angry. He repeatedly requested and screamed at the therapist. Then he walked back and forth across the room. At times, he became quite aggressive to the level that the therapist actually felt threatened by him. His mother too was worried because he was also displaying aggressive and challenging behaviour in pre-school, and sometimes hit smaller children. This aggressive behaviour continued and became an issue in the free play trials as well as at the pre-school.

Animal obsession and variation of how he played: He did not respond when the therapist introduced toys that had no relation to animals, but responded well when she introduced animal related materials such as an animal puzzle. However, the way he played was quite autistic too. He would take out each animal piece from the puzzle, and line them up horizontally, vertically, or in his own systematic way. He occasionally responded to the therapist’s request if the therapist’s request was interesting to him such as “let’s make animal sound”. While he was participating in

making each animal sound such as dog, tiger, elephant, etc, there were a lot of eye contact, joy and emotional synchronicity. This vocal turn taking of making each animal sound was of such a quality that sounds, gestures, and other elements of musical synchronicity came to life.

6.5.6 Postlude

While his mother became hopeful after the music therapy trial, she became worried after free play trial. She well recognized the value of music therapy and how the music therapist worked with some of the autistic traits of E in a developmentally fruitful way. After the trial, the mother decided to stop coming to the clinic and to find similar forms of therapy nearer to her home, due to the distance and her own health problems.

6.6 Subject F

6.6.1 Case information

Table 6.22 presents the case information of subject F, who was a non-verbal, low-functioning autistic boy.

Table 6.22 Case information of subject F

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
F	2	3.03	Severe	PV	42.5	71.0	60.0	C	N	M	1/No

6.6.2 Early history and concerns of the parents

F was the second child in the family and had six years old brother. His mother was the only full-time working mother in this clinical trial. His physical developmental milestones were within the normal range. His mother told the researcher that F was not a demanding baby and used to say few words such as ‘milk, mummy, no’. However F did not speak after infancy. It was about his second birthday that the parents began to see the seriousness of developmental problems. He did not respond to when they called or directed him. He often threw uncontrollable temper-tantrums too. They visited the child psychiatry unit at SNUH when he was 30 months old and received diagnosis of severe autism. F attended the mother-child attachment programme for six months at SNUH and from there was referred for this study.

6.6.3 Relevant background information about the mother and the family

The mother was a very dutiful and devoted mother trying her best to help F. She learned how to play with an autistic child at the mother-child attachment programme and tried to apply the professional skills she observed and learned from all the professionals she encountered including the researcher. His father played rough and tumbles with F when he had a time, but was mostly quite a busy man. F was an aloof child with severe temper-tantrums, who was taken care of by the grand parents during the day as both parents worked full time.

6.6.4 Results from the analysis of pre, in between and post treatment measures

6.6.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.23 reports social approach scores of PDDBI done by the mother and child psychiatric nurse who ran the mother-child attachment programme at SNUH.

Table 6.23 F's PDDBI-social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>	<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>
<i>F</i>	2	34	46	46	14	25	39

The mother's scores report some improvement after free play, but no improvement after music therapy. The child psychiatric nurse's score reports some improvement after free play and slightly more improvement after music therapy. While the mother's score showed no improvement after music therapy, her comments were entirely different. The mother recognized that music therapy worked better for F and therefore she decided to continue with music therapy in the clinic. However, she commented that since she observed every session of F in the clinic, she became more aware of severity of his condition and scored less favorably as time went on.

6.6.4.2 Early Social Communication Scales (ESCS)

Table 6.24 reports F's sub-scale scores of ESCS.

Table 6.24 F's sub-scale scores of ESCS

<i>Subject</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
<i>F</i>	2	Pre FP	0	0	0	0	1	0	0	0	0

		In between FP & MT	0	0	4	1	0	0	0	0	0
		Post MT	12	0	2	1	1	0	0	0	2

Like most children in this trial, F showed marked improvement in IJAL (eye contact, alternating eye contact between the object and the tester). He also showed improvement in RSIH after music therapy. There was only slight improvement in RJAL and RJAH after free play. In general, there were hardly any changes after free play while more changes were noted after music therapy when compared to free play.

6.6.4.3 Mother Play Intervention Profile (MPIP)

Table 6.25 presents MPIP scores of F.

Table 6.25 F's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
F	2	Pre FP	M	Of	Oc	M	N	M
		In between FP and MT	Oc	Oc	Of	M	N	M
		Post MT	N	N	M	M	N	Of

His mother showed remarkable changes in her approach with F in her home based free play time. Throughout three data collections, she was able to lower the level of being directive, and was gradually better able to respond to the child's behavioural cues and play with him at his level and focus.

In the first data collection, the mother showed a lot of initiation in playing with him by offering play materials, but was also sensitive enough to respond to his behavioural cues. Yet, the more solitary F became, the more she tended to intervene and direct F.

In the second data collection, the mother allowed F to choose play materials and tried to join in with the object play of his attention and interest. However when the mother tried to join in with him, he often slipped away.

F chose the calendar, which was his latest obsession. He used it in different ways and the mother sensitively and subtly joined an ever-evasive F.

6.6.5 Clinical vignette with descriptive analysis and discussion

F had the characteristics of a fighter, who was easily irritated and prone to throw temper-tantrums when he felt he was being disturbed by people making

interpersonal demands. The people who tried to join his world were the two therapists and his mother during the clinical trial.

6.6.5.1 Free Play

Mini cars in solitary play and how E responded to the therapist: F was an aloof child who played with mini cars throughout the session and occasionally with other play materials. On the first session day, he was extremely irritable and did not want to come inside the therapy room. Therefore, his mother came in with him. He went quickly to the dump truck, pushed it back and forth. When the therapist approached, he made an angry vocalization. Therefore, the therapist sat back little away from him. He played with the dump truck in the corner of the room with his back toward the therapist. When the therapist commented on what he was doing, he made an irritated vocalization. Therefore the therapist just watched for a while to let him settle down in the new environment. Then there was a moment when he turned the truck upside down and began to roll the wheels. The therapist gently approached and rolled one wheel of the dump truck when there was a pause. He rolled again, and then the therapist did it again. He sighed and turned the dump truck the right way up to its original position. A little later, he demanded to go home. In the 8th session, when the therapist tried to invite him via modeling using one of his favorite toy bulldozers, his rage exploded. He threw his bulldozer first, and then the therapist's bulldozer in a violent manner.

Commonly observed defensive behaviours in F: The issue of control was also present in F's free play trials. He rarely responded even if the therapist introduced some modeling in a careful and non-intrusive way during the second half of the session with separate play material, which was within his interested range. However, if her demand was too overt (verbal demand) or somehow not tolerable, he often destroyed the play materials chosen by the therapist.

Requesting what he wants: However as the session went on, there were things he could not manage, and then he would approach the therapist and demand her to fix the problem, or requested her to perform something he wanted. He used her instrumentally. This protoimperative type of behaviour is not impaired in autistic children.

Getting used to the therapist and free play sessions: The Overall positive aspects of free play were that he liked to come to the free play session and enjoyed his play. The therapist worked sensitively and responsively and F became used to her comments and encouragement. Little by little he began to respond to the basic

structure of the therapy session, such as the good-bye rituals. In the 12th session he sat in his chair and had final good-bye with the therapist.

6.6.5.2 Improvisational music therapy

Typical sessions: At the beginning of the music therapy sessions, F used instruments in a similar to using his favorite toy, the “mini car” and did not seem to be interested in the musical usage of instruments. As he was a very aloof child, sharing instruments was not possible. When the therapist used the chroma harp with a greeting song, he became interested. However, F refused to sit with the therapist. He was waiting for the moment when the therapist was away from the chroma harp and then he tried to drag the chroma harp to the corner of the room and explore it by himself. Since it was a rather heavy and large instrument and F was a small boy, the therapist tried to assist him, but it was in vain. He often threw a temper-tantrum when the therapist tried to assist him, or when he was stopped from dragging it to the corner.

Development of vocal exchange: The therapist was able to work with his vocalization using her voice and playing the piano, often using matching, imitating, or reflecting techniques. Soon a lot of spontaneous vocal exchange occurred as was previously reported in non-verbal children’s case studies (6.3, 6.4).

Accidentally blowing the horn: The therapist introduced Nordoff-Robbins blowing horns. F did not use it as an instrument for the first time, but rather used it in an idiosyncratic way. While exploring the horn, he made an accidental sound on it. He never blew anything before and the implication of blowing (controlled use of the breath and mouth) for the development of language was well known. Therefore, the therapist began to work with horns and whistles.

Ambivalent reaction at the therapist’s intervention: Little by little, during the second half of the session, the therapist introduced different horns and whistles. He was resistant by showing different levels of protest from making a grunting sound, slipping away, screaming and throwing an uncontrollable temper-tantrum. At the same time, he also appeared to find that this new experience was rather interesting. In fact, he was showing ambivalence towards not only horns and whistles, but also towards the therapist’s intervention. Therefore, the therapist worked sensitively following his minute responses each time. When introducing horns and whistles, the therapist blew first when he was watching, and then put the horn, or whistles to his lips. He responded most of the time by blowing even though he had the tendency to slip away quickly. Blowing horns and whistles became the main activity in the second half of the music therapy sessions and this activity happened more in a turn-taking form,

although such an engagement was not fully his intention.

Although approached sensitively, this somewhat directive approach was rather stressful to him, so that he threw temper-tantrums whenever he was overwhelmed.

Hopeful signs in F's development: The hopeful thing about F was that even when he was angry about the therapist's demands, he responded by taking part in musical interaction even while he was crying. Towards the end of music therapy trials, the therapist successfully introduced the kazoo to him with the result that he was not only blowing, but also was intentionally making various melodic sounds through the kazoo with the therapist in a turn-taking form. In that stage, he was holding his own kazoo and blew in his turn, and then always passed the Kazoo to her. Self-regulation was gradually improving during the music therapy trials so that he was little more able to follow the direction of the therapist and became little more cooperative towards the end of the music therapy trial. In that period, F began to speak a few words too, which was also hopeful.

6.6.6 Postlude

F's mother was impressed by the effects of music therapy and welcomed the possibility of developing his language ability. F continued eight months more in music therapy and his language gradually developed throughout the sessions. At the beginning of this year, the mother tried to integrate him into a mainstream pre-school near their home. The mother's work situation changed and she was no longer able to bring him to the clinic. F was still a fighter, but his ability to regulate his anger and irritation improved a lot and the duration of throwing a temper tantrum was gradually shortened. Both his mother and the researcher said to each other during the final interview of music therapy that F had come a long way.

6.7 Subject G

6.7.1 Case information

Table 6.26 presents the case information of subject G, who was a non-verbal, low-functioning autistic boy.

Table 6.26 Case information of subject G

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
G	2	3.09	Severe	PV	37.5	54.6	68.0	C	Me	L	1/No

6.7.2 Early history and concerns of the parents

G was the second child in the family. He had a seven-year-old sister. Physical milestones were all within normal range. He did not babble much as a baby and never developed any language skills. His parents began to notice when G reached 20 months that he did not respond when they called him. Soon after his second birthday, they visited the child psychiatry unit at SNUH. At 25 months, he was diagnosed as severely autistic and began to attend the mother-child attachment programme for six months at SNUH. From SNUH, they were referred to this study. Due to the extremely short attention and restless behaviour of G, he was receiving Methylphenidate and the medication was stabilized long before the trial.

6.7.3 Relevant background information about the mother and the family

His mother was a patient and loving mother. She was also very trusting person who appreciated the chance to participate in this study and consulted the researcher for educational and therapeutic directions. The only problem was that the family lived far away in the countryside, and it took at least three hours to come to the clinic and three hours to go back. Despite the long distance traveling, the mother was always punctual, hardly ever late for the appointed time.

6.7.4 Results from the analysis of pre, in between and post treatment measures

6.7.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.27 presents social approach scores of PDDBI of G measured by the mother and the teacher in special education.

Table 6.27 G's PDDBI-social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>	<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>
<i>G</i>	2	32	41	53	17	7	24

The mother gave scores showing some improvement after free play and slightly more improvement after music therapy. The teacher's scores show that there was regression after free play and marked improvement after music therapy. Like most mothers, G's mother also gave higher scores compared to the teacher.

6.7.4.2 Early Social Communication Scales (ESCS)

Table 6.28 presents G's sub-scale scores of ESCS.

Table 6.28 G's sub-scale scores of ESCS

<i>Subject</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
G	2	Pre FP	2	0	0	3	1	1	0	2	6
		In between FP & MT	3	0	1	2	1	0	0	1	1
		Post MT	4	0	2	4	1	0	0	0	1

IJAL and RJAL show slight improvements over time, but there was no difference between free play and music therapy. G did not score IJAH and ISITs at all, which was typical of autistic children as observed across cases in this study. The scores of RSIL and RSIH show regression over time. Only RJAH stands out showing scores, which were much better after music therapy than free play. The implication of RJAH improvements will be discussed in chapter seven.

6.7.4.3 Mother Play Intervention Profile (MPIP)

Table 6.29 G's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
G	2	Pre FP	M	M	N	M	N	Of
		In between FP & MT	M	M	N	M	N	M
		Post MT	M	M	N	M	N	M

As G was an extreme aloof child, who seldom sought interaction with anybody, and his mother was active the entire time in order to keep contact with him. During the first and second data collection, G was fascinated with the camcorder the research assistant was using. In order to film the interaction, the mother actively intervened and physically held him. G often slipped away in order to get to the camcorder. Since the camcorder was not a toy, G was not allowed to play with it. Therefore, there was a struggle between three people (G's mother, G and the research assistant). At the 3rd data collection however, G was able to play with the mini car, puzzles, and a book. His mother constantly offered play materials and tried to draw G into mutual activity. Responsiveness towards his mother's intervention seemed to have improved over time. However, there was no qualitative change about the way his mother played with G. The implication of this finding will be discussed further in the

discussion section.

6.7.5 Clinical vignette with descriptive analysis and discussion

G had the free play sessions first and the music therapy sessions later. G was a restless child, whose attention span with one object usually lasted less than 10 seconds. He had a flat facial expression and almost looked quite serious. During the trials, the researcher found out that this was one of the side effects of Methylphenidate. He displayed his typical behaviours described above in the free play sessions whereas he was spontaneously engaged with the music therapist through the mutual music making processes in the music therapy sessions.

6.7.5.1 Free Play

Restless boy: From the first session till the last session, he displayed a restless behaviour, always touching this and that toy, each for an extremely short time (no more than 10 seconds). Every two or three minutes, he tried to get away by opening the door, which made his mother who was observing the session through the TV monitor in the waiting area, respond immediately and hold the door tight so that the therapist could have an uninterrupted session with him.

Territorial behaviour: Like most autistic children in this study, he was also very territorial so that if the therapist tried to join him (or tried to take turns with him) by playing alongside with a mini car similar to his own, he would stop his play and took the therapist's car into his area, and then turned his back to the therapist. If the therapist suggested and modeled something, he either did not respond, or made clearly "no" gesture with his hand swaying horizontal way in the air.

Requesting to fix broken mini car: Although his aloof way of playing did not improve very much, he was beginning to use the therapist when there was a problem, such as coming to her and asking her to fix the broken mini car. About half way through the free play trials, he was not displaying the escaping behaviour as much as he used to. In the 5th session, he was unusually calm and looked through the window for a long time while sitting at the footstall of the big window in the therapy room.

More jumpy and disruptive behaviours: However as the sessions progressed, he would come and scatter all the play material all over the floor in a very disoriented and disturbed way, and became quite easily irritated. By the 7th session, he would occasionally respond to the therapist's modeling at a time, and then angrily threw the play material away. His behaviour became more jumpy and disruptive as it came near the end of the free play trial period. He was not only scattering the toys all over, but he

was kicking and throwing the toys as well. At this time, his speech therapist suggested the additional diagnosis; possibility of Attention Deficit Hyper Activity (ADHD). However when he became interested in spinning the piccachu top, he showed unusual patience with this toy and practiced pushing the wire into the right hole of the top and pulling it out. Therefore, G showed that when he was interested in something, he was able to display a relatively long attention span with patience.

6.7.5.2 Improvisational music therapy

Music making and playing: In contrast to the free play sessions, G showed a lot of interest in playing instruments, and explored and spontaneously imitated the way the therapist played each instruments. Moreover, from the beginning he was quite cooperative with the therapist even though his attention span was quite short in the beginning. This is a shortened version of the 1st session's first four minutes records;

'He came in and immediately went to the xylophone and touched it with his hands. When the therapist suggested sitting at the table on his chair, he responded the second time he was asked. When the therapist began to sing and play the "hello" song, he strummed the chroma harp within 10 seconds of the therapist's initiating the hello song. He strummed very fast and said "hae hae (in English 'do, do')". Although the therapist was not sure whether it was a meaningful word or simple vocalization, it was a perfectly understandable expression within the context. He then walked around on his toes, touching the xylophone, the chroma harp and then climbed up the table. He then went to the drum, hit it once, walked away, came back and hit again, and then the therapist hit the drum too. A short turn-taking started.'

Favorite instruments spontaneously sharing in a turn-taking form: Gradually, he developed his favorite instruments and his favorite way of playing and interacting with the therapist. Those instruments were the Nordoff-Robbins horns, the piano and the xylophone.

Throughout the session, he was able to initiate his favorite instrumental playing in his own way with such an excitement. For example, he would run to the piano, and sit at the bass part of the keyboard and wait for the therapist to come. When she came and sat at the treble part, he would start playing. G played one finger in a fast descending scale and then would wait for her turn. When the therapist played matching his speed and dynamic, he would look at her and smiled. Occasionally the therapist introduced different ways of playing, such as using black keys, or playing an ascending scale. To that he would imitate once, but hardly twice. This became just an

enjoyable ritual that can be called an ‘interaction theme’ which became the joint interaction history (Holck, 2004a) between them. When G had such a good musical interaction with the therapist, he was reluctant to finish the session. He also spontaneously bowed several times at the good-bye time (a polite Korean greeting at the moment of separation). He then would come back and open the door of the clinic three or four times to see the therapist again. Some form of attachment to the therapist was obviously formed.

Initiation of gestural interaction: From the 4th session, he also developed gestural playing throughout the session. He would make hand and foot movements and then looked at the therapist intently, expecting the therapist to imitate his gestures. Later he vocalized with gestural interaction simultaneously. As the sessions went on, more complex cross-modal/multi-modal interaction developed. He began to mix vocalization, instrumental playing, gesture and movement usually with the xylophone playing. He would initiate playing the xylophone in turn-taking forms, and then would suddenly lie down on the floor, put his hands up in the air and expected the therapist to follow. When the therapist did, he would sometimes roll his body over and then sat at the xylophone again ready to play. All the while, active eye contact and vocal exchange was also often present between them.

Compulsive behaviours at the therapist’s interpersonal demands: Although he was much more cooperative in the music therapy condition than in the free play condition, he also showed difficulties of letting the therapist structure the session (issue of control). Every time when the therapist tried to do modeling, or turn-taking as unintrusively as possible within his focus of attention and interest, his anxiety level seemed to escalate; vitality of his facial expression was soon sucked out of his face and he became sullen. He then started compulsive behaviours, either biting his nails, or picking his nose. When he began this type of compulsive behaviour, it usually continued till the end of the session. His mother told the researcher that at times he bled by picking nose and biting nails and still would not stop. When this happened, he would not bow when he went away and did not come back to see the therapist again. Watching him falling into such state was painful to the therapist (the author). Therefore, a lot of sensitive care was taken for the second half of the session when the therapist was supposed to provide some structure to the music therapy.

6.7.6 Postlude

During the final interview, it was evident that G’s mother was aware of the positive effects of music therapy. However, she did not become fully aware of what

was so different about music therapy until the researcher showed her some recorded session samples of free play and music therapy comparatively and explained in detail how he was at the beginning and how he had developed by the end. The teacher in special education also reported that he was responding more to the teachers in his classroom during and after music therapy. G continued to have music therapy for eight more months and he also developed some language skills to the degree that he used one word expression (such as ‘car’, ‘do’, ‘go’). His mother reported that his level of self-regulation improved too. It used to be very hard to take him outside since he was always restless and often moved too fast. Therefore, she lost him occasionally in the street and therefore, always held his hands tightly in order not to lose him again. Now, she can walk without holding his hand and he will respond if she warned him from a distance with some words like “stop, watch the car”.

6.8 Subject H

6.8.1 Case information

Table 6.30 presents the case information of subject H, who was a verbal, high-functioning autistic boy.

Table 6.30 Case information of subject H

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
H	2	4.05	Mild	V	36.5	64.3	NT	C	N	M	N

6.8.2 Early history and concerns of the parents

H was the only child of the family. H’s Physical milestones were within normal range. His parents first noticed something was wrong with him at about 12 months of age. He did not respond when he was called and his language was delayed. He said his first word ‘flower’ at 24 months, but did not speak again until he reached three. His parents visited just after his 3rd birthday and at the age of 3.3 years old, he was diagnosed as autistic. H and his mother the attended mother-child attachment programme at SNUH and were referred for this research. H’s mother informed the researcher that she used to invite children living next-door hoping H would get interested and play with them. When other children were around, however, he would go into his own room and locked the door, and only came out after they were gone. After many failed trials, she gave up trying.

6.8.3 Relevant background information about the mother and the family

H's mother was one of the most capable mothers, gaining H's attention and motivation at his level in home situation in this study. She did home schooling with H, and his language skills were developed and shaped by her intensive work everyday. His parents appeared to have studied on the subject of autism in depth and they also speculated about the possibility of H having an Asperger's syndrome. The first interview was not with his mother, but with his father. For the decision of participating to this study, H's mother asked her husband to visit the clinic for the first interview and make the judgment. After the interview, the father told her; "this is the top quality service that we should not miss." H's mother therefore showed a lot of respect after that and consulted the researcher on the matters when she became confused with other professionals' opinions on H. In fact, she did not need much guidance, but more an affirmation on whether she was doing the right way, or not.

6.8.4 Results from the analysis of pre, in between and post treatment measures

6.8.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.31 presents H's social approach scores of PDDBI.

Table 6.31 H's PDDBI-social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>	<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>
<i>H</i>	2	65	73	73	42	49	73

The mother's scores indicate there were some improvements after free play, and no improvement after music therapy whereas the scores done by the teacher shows slight improvement after free play and marked improvement after music therapy. The mother tends to give higher scores than the teacher, but the last scores were identical between the mother and the teacher. This finding corresponds to the group results showing that mothers tend to give much higher scores than the professionals, but the difference between them got smaller in time.

6.8.4.2 Early Social Communication Scales (ESCS)

Table 6.32 H's sub-scale scores of ESCS

<i>Subject</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
H	2	Pre FP	9	0	4	5	0	1	0	1	4
		In between FP & MT	12	0	6	8	1	2	0	2	4
		Post MT	29	0	6	8	1	2	2	5	7

The scores of IJAL, RSIL and RSIH reports slight improvement or stable scores after free play, and more pronounced improvement after music therapy. H also scored ISITS (teasing behaviour during social interaction) after music therapy, which was remarkable for the autistic child considering their pathology. RJAL and RJAH improved to the maximum scoring range after free play and stayed at that level after music therapy. On the whole H made more improvement after music therapy than after free play. This supports not the mother's score of PDDBI, but the teacher's score of PDDBI as more reliable score.

6.8.4.3 Mother Play Intervention Profile (MPIP)

Table 6.33 presents H's MPIP scores.

Table 6.33 H's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
H	2	Pre FP	M	M	N	M	N	M
		In between FP and MT	Of	M	N	M	N	M
		Post MT	M	M	N	M	N	M

H's mother provided play material, play rules, and gave a lot of social cues. She knew what H responded well and what he enjoyed. Therefore she used simple and predictable games and motivated H to interact with her through offering a lot of fun and tokens (smarties) within the game. The characteristics of the mother's intervention did not change throughout the trial period even though the play materials did.

6.8.5 Clinical vignette with descriptive analysis and discussion

H was a very talkative and restless boy, who was able to approach adults and ask questions in his idiosyncratic ways. H's mother told the researcher that he was very interested difficult words (mostly technical jargons) and English. This was also revealed in the free play and the music therapy sessions.

6.8.5.1 Free Play

Repetitive Idiosyncrasies in approaching behaviours: Throughout the sessions, he was constantly very talkative, speaking to both the therapist and also to himself. To every session, he brought the two mini cars from the waiting area to the therapy room and was very fond of playing with a lot of different mini cars, especially in systemizing the cars into different categories. He would go to each car saying, “this is a small police car and this is a big police car. What’s this?” He also named mini cars with originality “this is a rocktide car. What is this”. On the surface, it looked as if he was initiating and continuing a conversation with the therapist. He would, however, talk only about what interested him, what was visually obvious and only wanted the same and anticipated answers from the therapist. This rather obsessive way of talking was displayed throughout the trials. This way he controlled what to play, how to play, and even how the therapist should respond.

Turning any new activities into his ritualized interaction: As he was so preoccupied with the mini cars and he did not easily allow the therapist to respond, or initiate new ways of interacting, the therapist tried to channel his attention by introducing something new play materials, which were quite interesting to his level especially in the second half of the session. She introduced, for example, wood fruit cutting activities and play dough activities. As those play materials were interesting, he usually responded well and joined her initiated activities. However, after a while he resumed his own way, “this is very sour lemon, ...this is very sour lemon, and the lemon is?” asking the therapist to say “very sour” repeatedly.

Commonly observed defensive behaviours: As the sessions went on, he sensed that the therapist would usually let him play what he liked and began to introduce structure in the second half. The moment that the therapist did try to introduce structure, his behaviour often became compulsive, often bringing out some play material not related to the current activity between himself and the therapist and did what he did the best. For example, during the second half of the session, T initiated making pizza, which in previous sessions he liked to make with play dough. He was not responding, but rather preoccupied with the mini car. When the therapist demanded again, he suddenly brought a toy bed, and a toy chair from the doll’s house saying, “this is a tulip bed and this is a tulip chair, what is this?”. The therapist often told the researcher that the moment she began to introduce a structure, no matter how gently, she felt his anxiety level escalated quickly and he displayed more compulsive and obsessive behaviours.

Development of imaginative play and less compulsive behaviours: Gradually

he was able to develop his play a little more meaningfully at times, so that he was able to converse with the therapist with a less repetitive compulsion and develop some level of imaginative play within his limited capacity. For example, he was playing with play dough and using the car wheel to make a stamp on the play dough. Then he said “danger”. When the therapist asked what was dangerous, he said “cave” and later “tunnel”. He also played with dolls and sent his daddy and mummy to the space. It seemed he was able to pay certain level of joint attention and share imaginative play when the subject of the play was within his own interested area while he was in a good mood, but not readily able to switch to the subject of another’s interest.

Joy in free play and a song used defensively: Overall, H liked to come to the free play sessions and showed affectionate behaviour toward the therapist. He also occasionally sang a song even though it was often used as a defensive purpose. When the therapist began initiating a certain interaction, he would sing a song so that he still had the control over what they did during free play. The therapist knew this, but joined him by singing the same song for a while allowing the child a moment of joy and relaxation after anxious moment of facing the imposed structure by the therapist.

The value of a child-centred approach: His mother informed the research team that he never liked early intervention programmes of any kind. H always complained a lot to the teacher at the behavioural science centre that he attended. What the mother valued and noticed from the free play trials in the clinic was that he was always very eager to come and looked very happy to play with the therapist. The value of a child-centred approach was confirmed by H’s mother.

6.8.5.2 Improvisational music therapy

A lot of difficulties of change: Difficulties with change were pronounced from the beginning of the music therapy condition. At the start of music therapy, although it was announced that music therapy would come after the free play, it appeared to have been a shock to him when he entered music therapy for the first time in the same room, but in a changed environment. There were neither toys nor his favorite mini cars to play with. He was visibly disturbed and started complaining, “I don’t like harp” and then played the harp for a short time, and then said, “finished, can I go now? I don’t like harp”. He did open the door and tried to get out. When the therapist managed to keep him in the room, he grumbled a lot and became even more anxious and frantic. He would explore instruments idiosyncratic way. He would dismantle the xylophone and ask, “is it a wood xylophone? What xylophone is it? Is it real?”, and then saying “Good bye, finished” over and over again. When the therapist said there were many

instruments, which she liked to show him that he might like, he played a little more and then said “I can’t do it anymore, I don’t like music therapy because it’s loud. Music therapy is loud”. Nevertheless he continued to explore the instruments, which the therapist introduced and found some whistles that were interesting. However, he was still quite frantic. He pulled out the ball of red handbells and became even more visibly disturbed when the therapist said, “oh, you should not do that. It’s broken. It makes no sound now”. He requested new handbells. In a way, he became quite obsessed with brokenness throughout the sessions that he would ask the therapist “it’s broken. did you break it?” “it’s yours, not mine”. He had three intact handbells and played them and said, “these are O.K” and then played the red one “it has no sound, broken” repeatedly. He often demanded to throw it away. It seemed he was quite distressed by the new situation and unexpected event of a broken instrument.

H’s ways of exploration: Gradually he settled down into the musical environment and began to explore instruments in his own way. He began to divide instruments into his and the therapist. Since the researcher had prepared most small instruments in pairs, it was not difficult to do that. He would sound each instrument and became so preoccupied into dividing them into two groups. Later this became an anticipatory play. He would pick up and make some sound on the paddle drum saying, “it’s H’s turn”. Then the therapist was expected to pick up and do the same saying “it’s Sunsangnim’s turn (i.e., therapist)”. He began to enjoy musical play in his own predictable way.

Volume minus and volume plus: At the 4th session, he initiated a ‘volume minus’ and ‘volume plus’ game with instruments. That means H played softly on his choice of instrument and the therapist was expected to play loudly on the same instrument. While they were playing his initiated turn-takings, a lot of spontaneous eye contact, joy and emotional synchronicity occurred and in the middle of this interaction, he often called the therapist “mummy sunsangnim” in his excited and animated voice. Calling music therapist ‘mummy’ was observed in other children’s case studies in this study. At a later stage, this volume minus and volume plus became such a complex interaction that he began to initiate gesture, movement, and imagination all into this musical turn-taking interaction. In some ways, he had a degree of originality in his imagination and initiation of interaction.

Commonly observed defensive behaviours: Issues of control were also evident, but his defensiveness began to be displayed in a musical way. For example when the therapist tried to do the modeling, he would begin to sing “10 little Indian boys” in English. Then the therapist stopped modeling for a while and began to

accompany him with the piano. He danced and sang with her accompaniment.

Broken instruments, throwing away and approaching ending: Towards the end of music therapy, he again became rather distressed. When the impending ending of the sessions was announced, he exhibited disruptive behaviours such as; compulsively pulling out the leaves of the tree in the room and dismantling the xylophone. He would point out some faults in each instrument and insisted that they were broken. H insisted that we throw away the ‘broken instruments’ and yet those so called broken instruments were his favorite instruments. It seemed that it was hard for him to like things when he knew the end was impending. It was as if he had to devalue and discard those instruments before the end.

6.8.6 Postlude

His mother could not understand why he discarded what he liked so much at music therapy and also at home. For at home as well as the end period of music therapy, he was discarding his favorite toys and books insisting “these are broken”. The researcher explained what might have been going on in his mind and such young children’s fear of ending (separation), as well as a limited capacity for self-regulation and containment for such occasions. After the trial, H’s mother said it was the first time that H actually enjoyed interacting with adults other than herself and the qualitative aspects of interaction in music therapy (joy and emotional sharing) were similar to what she had with H at home. She also told the researcher that she understood why H called the music therapist ‘mummy’. The mother contacted the researcher from time to time, especially when she had to decide a certain direction towards the next critical step such as whether to send him to the mainstream primary school, or to a special school. After the trials were long over, there was speculation as to whether H was an Asperger’s or autistic child among staff at SNUH. The mother left a message to the researcher saying, “it was just as you predicted”.

6.9 Subject J

6.9.1 Case information

Table 6.34 presents the case information of subject J, who was a verbal, high-functioning autistic boy whose IQ was within the normal range.

Table 6.34 Case information of subject J

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
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J	2	5.11	Normal	V	32.5	57.0	NT	NT	CM	M	N
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6.9.2 Early history and concerns of the parents

J was the only child in the family. Physical development was slightly delayed. J walked at 20 months and his language was quite delayed. He spoke his first word ‘train, tunnel’ at about 2.5 years. He began to speak in sentences when about 3 years old, but mostly echolalia to what his mother said. His parents began to notice something was not right at around his third birthday. In addition to the language delay, he did not play with other children. When he reached four, the parents and J visited the local child psychiatric hospital. There was speculation regarding autism, but the psychiatrist did not confirm the diagnosis. J received speech therapy for a while. The same year, his family went to the U.S for a year because of his father’s work, and then returned to Korea the following year. Upon returning to Korea, they visited the child psychiatry department at SNUH and a confirmed diagnosis of high-functioning autism was made and J was referred for this study. J’s mother also told the researcher that J was slow in his behaviour and in his response to people.

6.9.3 Relevant background information about the mother and the family

The first and lasting impression of J and his mother was their depressive mood. J and his mother were good-looking and always well dressed, but somehow lacked the vitality. She also had the attitude of teacher towards her son, noticeable when undertaking the MPIP. The mother was a quiet person with a few words that unless the researcher asked something, she would not voluntarily talk about her child and herself. After the trial, the researcher happened to talk to J’s pre-school teacher on the phone concerning the PDDBI, and the teacher informed that J had been taking Methylphenidate¹⁶ (Ritalin) for about two months. The teacher noticed side effects such as lack of response and a depressive mood. His mother failed to inform the researcher on this matter. This will be explained further in 6.9.5.

6.9.4 Results from the analysis of pre, in between and post treatment measures

6.9.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 6.35 presents J’s social approach scores in PDDBI.

Table 6.35 J’s PDDBI-social approach scores

Subject	Group	Mothers	Professionals
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¹⁶ Methylphenidate is a pharmacological stimulant used with children diagnosed with Attention Deficit Hyperactivity Disorder (AD/HD) a condition sometimes co-morbid with autism.

		<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>	<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>
<i>I</i>	2	47	67	84	47	60	68

Both the mother and the teacher recognized that there was more improvement during the free play condition than the music therapy condition. J was under Methylphenidate half way through the music therapy condition. Lack of responsiveness and depressive moods are occasionally noted during the early phase of methylphenidate, until doses are adjusted. In this case, the introduction of medication may have had a short-term negative effect on behaviour during the music therapy condition.

6.9.4.2 Early Social Communication Scales (ESCS)

Table 6.36 presents J's sub-scale scores of ESCS.

Table 6.36 J's sub-scale scores of ESCS

<i>Subject</i>	<i>Group</i>	<i>Time</i>	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
<i>I</i>	2	Pre FP	1	0	6	7	0	2	0	0	4
		In between FP & MT	13	0	6	8	2	2	0	5	7
		Post MT	14	0	6	8	2	2	0	6	7

The general tendency of the ESCS results supports the general tendency of PDDBI results scored by both the mother and the teacher. On the whole, there was more improvement after free play than after music therapy. There was either no change in scores or a slight improvement after music therapy.

6.9.4.3 Mother Play Intervention Profile (MPIP)

Table 6.37 presents J's MPIP scores.

Table 6.37 J's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
I	2	Pre FP	M	M	N	M	N	M
		In between FP and MT	Oc	Oc	Of	Oc	Of	Of
		Post MT	Of	Of	Oc	Of	Of	M

J's mother's intervention pattern seemed to have changed a lot during the

course of these clinical trials.

During the first data collection (pre free play), she used ‘bookwork’ reading and directing the child what to do. The mother usually asked questions and J answered.

During the second data collection (after free play), the mother seemed to have learned how to play with J by observing the free play sessions. She let the child choose the play material and followed the child lead. J seemed to initiate things to his mother by asking a lot of repetitive and obvious questions.

During the last data collection (after music therapy), his mother became a little more active. They were playing toys, and J was asking a lot of self-talking type of questions in order to obtain validation from his mother regarding what he already knew. She tried to join and direct D to develop his play constructively through storytelling. However, J’s story evolved regardless of the mother’s intentions.

6.9.5 Clinical vignette with descriptive analysis and discussion

J came across as a sensitive and subdued child, who responded well to the matching and imitating technique of the therapist. He enjoyed many toys and musical materials in both conditions. However, he developed better in the free play sessions than the music therapy sessions. Part of the reasons might have been circumstantial (the weather, the accident and the medication) that will be explained in 6.9.5.2.

6.9.5.1 Free Play

Predictability is assuring: J came 25 minutes earlier than the appointed time on the first session day. The therapist had not yet arrived. When the researcher told him that the therapist would come soon, he repeatedly told himself. “The therapist is coming soon” as if to assure himself until she came. When the therapist did come and started the session, he responded well to her sensitive matching and imitating way of working, which seemed to give him a sense of security that the therapist was behaving in a predictable way. J was clearly pleased to find some of toys were the same as at home, for example the bulldozer, which he started to play with first. Then he made a sound by hitting the Lego block on the table. When the therapist did the same, he smiled. He soon became relaxed, and looked around the room and found the play dough and asked for it. While he played, he talked about obvious things in a self-assuring manner and expected the therapist to agree. For example, when he played at a wood fruit cutting activity, he would say, “the chopping board is made of wood. This is wood. Made of wood” until the therapist said, “yes, it is made of wood. You are right”. When he was playing with the dollhouse, he would say, “there is a bed” “there

is a chair” until the therapist said, “yes, there is a bed and chair”. It seemed he wanted and needed her to confirm what he already knew and obvious. After he had an accident, he made a boy doll lie on the bed saying, “he has to rest because he got hurt”. In his play, what was experienced in the real world was also reflected in his play with toys in a concrete way.

Commonly observed defensive behaviours: Even though he displayed his own control issues, it was the mildest form of all the children in this research. When the therapist suggested doing turn taking, or modeling, he would usually respond verbally saying “yes”. Then he would either follow once at most, but hardly ever twice, or do something else.

Development of gestural interaction: J was often trying to find a key for the piano, for example when the therapist was trying to structure the session during the second half of the session. The therapist said that J would have an opportunity to play the piano and other instruments in music therapy, and then suggested to do pretend play – gestures of violin playing, guitar playing and piano playing etc. This interaction through gestures became a theme for interaction between J and the therapist. The therapist began to initiate with her hands making descending or ascending movement on the wall during the second half of the session and J followed in turns. This became later joyful interaction especially in the last session where a lot of eye contact, joy and emotional synchronicity seemed to have occurred. However, due to the blindingly strong sunlight coming through the clinic window, these events were not measurable on the 12th session DVD since the scene became too dark to identify eye contact and facial expressions. Throughout the free play trials across the cases, the researcher noticed that when a lot of joy and emotional synchronicity occurred, these interactions were musical by nature, including in J’s case.

Relaxed and happy: Overall, he was very happy to come to the free play session and his mood seemed to have lifted over the course of the free play trials. As he became relaxed and happy, he was more able to initiate interactions with the therapist and also at pre-school with the teacher. The pre-school teacher commented that he was visibly happy during and after the free play trials and responded better to the teachers than before. His parents also informed the researcher that he anticipated coming to the clinic and waited in expectation during the week. To a certain degree, his mother’s mood seemed to have lifted at the end period of the free play sessions.

6.9.5.2 Improvisational music therapy

Difficulties of change: In the first session, J came in with a bad cold and

asthma. His right leg was in plaster from an accident he had at the end of the free play period. He looked quite distracted by the changes of sessions from the free play to the music therapy. Even though he responded and explored what the therapist's introduced, somehow his playing was quite fragmented and his musical expression (especially rhythm, dynamic) often fizzled out shortly.

Commonly observed defensive behaviours: The issues of control were also evident. He usually said 'yes' to the therapist's suggestion, direction, or demand. However, the moment the therapist introduced the first structure in the first session of the second half, he had a violent attack of coughing and he started having hiccups. When he complied with her suggestion to play in turn, he looked away while he was playing in turns. While he was playing, he often just carried on playing, not readily leaving a gap for the therapist to play. The therapist had to stop him in order to have her turn. However, when she did, J often slipped away. In the 4th session, he even began to dismantle the xylophone when the therapist began to play it for her turn after waiting for him for a long time.

Administration of neuro-stimulant medication: On the date of the 3rd session, the researcher was informed by the mother that J and his mother visited the child psychiatry at SNUH for regular check-ups. Only when the trial was over was the researcher informed by the pre-school teacher that he was under medication for two months. The pre-school teacher also noticed a depressive mood, less responsiveness and some idiosyncratic behaviours.

Thunder and lightening: Since J had music therapy in the summer time, there was often a lot of rain and sometimes a thunder storm. He began to repeatedly talk about how thunder and lightening were formed in technical terms. He then played the drum and said, "this is a thunder and lightening". In time, he and the therapist were able to play out a lot of thunder and lightening music in a mutual music making process. After the session, his mother commented on the 'thunder and lightening music' saying; "he was frightened of the thunder and lightening and it seemed he was able to play his fear and worries in his music playing." This thunder and lightening theme was repeated a number of times.

Channeling defensive behaviour into playful interaction: As the sessions progressed, he appeared to be more distressed when the therapist began to structure the session through modeling and turn-taking activities. He pinched his own flesh here and there and grimaced saying; "this is pinching". When these things happened, the therapist acknowledged verbally what he did and imitated playfully. He became amused with it and this turned into a playful gestural interaction between J and the

therapist. The behaviour, which usually was considered as negative, became a theme for vocal and gestural interaction between them. J also initiated the interaction he enjoyed with the different therapist in the free play trials – gestural interaction of running hands over the wall in a descending movement. When the music therapist elaborated with animated and exaggerated vocalization and gestures similar to the way one might play with little babies, J began to enjoy initiating such interactions.

No intention to interact: However, overall, the therapist felt J was quite depressed and his behaviour was more fragmented than in the free play, and he was slower in his responses. During the 12th session, his toothache worsened (he was suffering from a toothache for some time). Therefore he was just in a bad mood. He then played the piano in a self-absorbed fragmented way. He not only did not give the therapist a space to sit next to him, but also took most of the keyboard space for himself by spreading both his hands very wide. Physically he blocked most of the space where the therapist could potentially join him. After a while, when the therapist managed to sit next to him and tried to join his piano play, he began to move the music stand up and down repeatedly and intentionally, therefore slipped out the moment the therapist joined him. The weather was stormy as well. This unusually prolonged rainy season in summer, together with the physical pains he had from his injuries to his right leg and his toothache, as well as the medication, all can be considered as contributing to the poor responses in these music therapy sessions.

6.9.6 Postlude

During the last interview, J's mother thanked the researcher for the progress he made and apologized for failing to inform the researcher about the medication. The matter of changing administration of medication was clearly stated in the parent's consent form and the exclusion criteria and was emphasized during the interview. The researcher was not sure whether J's mother intentionally did not disclose the information, or not. However, in line with the Consort Principles for reporting experimental studies, and considering the relatively long-term period these subjects were in therapy, the results from subject J retained and included in the analysis to avoid introducing a positive bias, therefore influencing the group results in a more conservative direction.

6.10 Subject K

6.10.1 Case information

Table 6.38 presents the case information of subject K, who was a non-verbal autistic boy.

Table 6.38 Case information of subject K

Sub	Group	Age	MR	Lan	KCARS	SMS	PEP	ADOS	Med	Eco	Sib
K	2	3.03	Moderate	PV	32.5	54.6	68.5	NT	N	M	1/No

6.10.2 Early history and concerns of the parents

K was the second child in the family and K had a 12-year-old brother from a different father. Physical development was very good (walking at 10 months). As a baby, K babbled and spoke his first word ‘papa’ before 12 months. However he did not speak after that period. His mother became worried about K’s lack of responsiveness towards people when he was about 24 months old since he did not make eye contact, nor speaks. He was extremely aloof and always played alone. At the age of three, his mother took him to the child psychiatry department at SNUH and had a diagnosis of autism. Until recently his father had been in denial of autism insisting that he was also quite like K when he was small. K attended the mother-child attachment programme at SNUH and was referred for this study.

6.10.3 Relevant background information about the mother and the family

K’s mother used to run her own business of a private teaching institute for children after school until she had K. She was an intelligent woman, somehow displaying rather extreme mood swings. She informed the researcher about her depression when K was a 15 month old due to a financial crisis at home and difficult relationship with her husband. She expressed her guilt feelings that she took care of basic things in that period, but was not attentive to K. She was still under an anti-depressant for some time during the trial. As K progressed quite well during this trial, her mood was also clearly lifted. However, when K did not respond well to the therapist at times, the mother’s mood dropped severely. The researcher noticed that many mothers, including K’s mother, were desperate to talk to her, using the researcher as their therapist though not intentionally. K was not interested in his older brother at the beginning of this trial, but at the end of the trials, K became interested, and began to play rough and tumble activities joyfully with his brother.

6.10.4 Results from the analysis of pre, in between and post treatment measures

6.10.4.1 Pervasive Developmental Disorder Behavior Inventory (PDDBI)

Table 3.39 presents K's PDDBI-social approach scores.

Table 3.39 K's PDDBI-social approach scores

Subject	Group	Mothers			Professionals		
		<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>	<i>Pre FP</i>	<i>In between FP & MT</i>	<i>Post MT</i>
K	2	58	69	79	57	56	65

K's mother's score shows an almost similar level of improvement in both conditions while the professional's (speech therapist) score shows almost no changes after free play, but some improvement after music therapy. While the mother's score did not differ, the mother pointed out the differences in K's responsiveness in both conditions. She said:

"K sat on his chair for longer time, but he played mostly alone with his toys in the play condition, whereas K threw temper-tantrum more in the music therapy condition, but he was much more able to interact with the therapist through music. There were qualitative differences between the two conditions."

6.10.4.2 Early Social Communication Scales (ESCS)

Table 3.40 reports K's sub-scale scores of ESCS.

Table 3.40 K's sub-scale scores of ESCS

Subject	Group	Time	<i>IJAL</i>	<i>IJAH</i>	<i>RJAL</i>	<i>RJAH</i>	<i>ISITt</i>	<i>ISIS</i>	<i>ISITs</i>	<i>RSIL</i>	<i>RSIH</i>
J	2	Pre FP	0	0	0	1	0	0	0	0	1
		In between FP & MT	1	0	0	0	0	0	0	0	0
		Post MT	3	0	5	5	0	0	0	5	2

There was marked improvement in the overall tendency of scores after the music therapy condition whereas there were almost no changes after the free play condition. The results of this ESCS score support the mother's comment on the difference of responsiveness of K between music therapy and free play condition.

6.10.4.3 Mother Play Intervention Profile (MPIP)

Table 3.41 presents MPIP scores of K.

Table 6.41 K's MPIP scores

Subject	Group	Time	MS	MA	MP	MI	CI	SC
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J	2	Pre FP	Of	Of	Oc	M	N	M
		In between FP and MT	Of	Of	Oc	M	N	M
		Post MT	M	Of	Oc	M	N	M

There seems to be hardly any changes in the way the mother played with K. This is congruent to findings of other studies as was presented in Chapter two.

During the first data collection (before free play) and the second data collection (after free play), K played mostly alone while the mother tried hard to join him. During the last data collection (after music therapy), the degree of the mother structuring and ‘being active’ did not change much, but K’s responsiveness did change. K was responding to the mother’s modeling and direction far better than the previous two data collections. However, as the researcher stated earlier this chapter in 6.1.4.3, the responsiveness of the child towards the mother’s intervention was not measured by the MPIP.

6.10.5 Clinical vignette with descriptive analysis and discussion

K was a restless, hyperactive, non-verbal child with a very short attention span, who was prone to throw temper-tantrum.

6.10.5.1 Free Play

Solitary toy play with much more increased attention span: K was extreme in his way of solitary play. While he would sit next to the therapist and play alongside, he would never allow the therapist to touch, join in with or intervene in his play.

A typical session throughout the 12 sessions was that he would sit on his chair next to the therapist’s and would manipulate his favorite ‘toy bulldozer’ in a certain repeated motion. Sometimes, he positioned the bulldozer at the edge of the table and this resulted in dropping it to the floor. The therapist tried to assist him by offering her hand to hold it steady. Yet each time, the therapist reached out to stabilize the bulldozer, he pushed her hand away since he was very territorial and not ready to share his toys with her.

Doll play: He also played with the doll’s house and manipulated the dolls. In his doll play, he made female and male dolls kiss and hug each other in an early session. After the session, his mother told the researcher that she and her husband performed affectionate gestures such as kissing and hugging each other, in order to encourage his attention to them and social learning. What he saw, he was able to then act out using the dolls.

New things are interesting as well as daunting: His style of toy play did not change much. However, the therapist managed to introduce and expand his attention gradually by introducing new and interesting play materials other than the bulldozer. When the therapist first introduced spinning top and small balls, he ran away to the corner of the room, but was interested. He was ambivalent about this new introduction of toys. So each time when the therapist showed these toys, he would excitedly run away, but with a watchful eye. When the therapist showed how to play those by modeling, he observed. However, when the therapist encouraged him to play by himself, he refused, but demanded her to show him repeatedly. It seemed these new toys were certainly interesting as well as daunting.

Vocal exchange: As he became accustomed to the free play sessions, he became more relaxed. When he was relaxed, his vocalization increased. His vocalization did not seem very intentional, or fully conscious, but at those intervals when there was a pause in his vocalization, the therapist did not miss the moment and took her part in vocal exchanges. Like most non-verbal children in this study, K did not show any aversive reaction when the therapist joined him through vocalization whereas other forms of interaction produced more defensive reactions from children with autism.

Towards the end of free play trials, a short turn taking occurred between K and the therapist via throwing balls and playing with an animal puzzle play.

Overall development in free play: Even though he did not develop social interaction with the therapist to a great degree and mostly played alone, his mother was very pleased with the outcome since he was actually able to sit in his chair for a long time and paid uninterrupted attention playing with the bulldozer because he had so often displayed restless behaviour at home and in other clinics.

6.10.5.2 Improvisational music therapy

Difficulties of change and temper tantrums: Since K liked very much to play with his toys, the first session of music therapy, in contrast, appeared to have been a very stressful event (even a shock to him) even though the research team and his mother prepared and explained to him about the change over to music therapy from free play for about a month. He displayed a lot of disruptive behaviour and extreme temper-tantrums and refused to have music therapy (wanting to go out). Therefore his mother came in together with him. The therapist tentatively introduced some instruments such as Nordoff-Robbins horns. When she showed how to blow them, K displayed an ambivalent reaction. He was interested in blowing the horns, but he

would always throw away the horns first with what appeared to be the irritation and anger, therefore refusing the therapist's invitation and suggestion to play together. Then he would pick them up to play alone. K displayed such behaviours a lot, and would not tolerate the therapist's touching the object he liked as well as the therapist's direction. The situation became worse when she stopped him from throwing the instruments in order to protect both herself and the instruments.

Moments of musical meeting and joint engagement in music making:

However from the beginning, there were moments when he picked up the two horns and began to blow one at a time. The therapist went to the piano and provided matching music to his horn playing. He looked at the therapist and looked away, then looked again, and looked away, all the time while they were making music together via two different instruments at a distance. He seemed to have been pleasantly surprised by her matching way of playing the piano to his sounds. He suddenly approached the drum and began to hit the drum very hard with the two horns and looked to the therapist again, monitoring her reaction in music and probably in person as well. A lot of spontaneous eye contact, joy and emotional synchronicity occurred between them.

Learned negative behaviours: An example of a learned negative behaviour with K was when he returned again to throwing the horns. It appeared that from his own experience, he found that throwing them was rather amusing. Perhaps he liked the loud sound as they hit the floor, or the feeling of 'discarding'. There can be many different types of gratification K obtained from this behaviour. The therapist had to take the horns away as it was dangerous activity and the horns were already damaged by his repeated throwing. Another bout of uncontrollable rage and temper-tantrums started all over again. During the course of the music therapy sessions, this was repeated many times even though his level of self-regulation improved more towards the end of the music therapy trials. Almost half of the total sessions were a war and a battle with K.

An interaction theme: Nevertheless, the drum and the cymbal playing and the therapist's accompaniment with the piano and singing became an interaction theme for them. He was much more capable of musical engagement when he and the therapist had separate instruments placed physically away from each other.

Initiation of spontaneous musical engagement: Gradually, he began to settle down and enjoy playing a lot of musical instruments especially different types of birdcalls. In the 6th session, he was blowing the crow call and the therapist accompanied him with the piano playing. At one moment, to her surprise (the therapist

is the author), he approached and offered his own crow call for the therapist to blow and spontaneously called her “mummy”. The therapist blew the crow call once, whereupon K went away blowing even more. This was a good sign of developmental patterns of musical interaction and the therapeutic relationship. Calling a music therapist “mummy” was also observed in other children’s cases in this study.

Spontaneous sharing and initiating interaction: The Overall development of K in the music therapy trials was quite dramatic so that by the 12th session, he was able to share the chroma harp and played it with the therapist during the greeting ritual. In the second half of the last session, he was blowing the two party whistles rather joyfully. He, then, approached the therapist at the piano and offered her one of his whistles to blow, and went away. He seemed to have learned that sharing and interacting with her was not that bad an experience after all. A little later, he re-approached her at the piano and pulled her hand out and led her to the corner of the room and offered one of his party whistles to her. Now, each was holding party whistles in their hands and turn taking through party whistle started.

6.10.6 Postlude

His mother was very pleased by the results of the two interventions; he showed improved attention span in free play and spontaneous interaction and initiation of spontaneous sharing in music therapy. K is the only one, who is still attending the clinic for music therapy. He now speaks on two, to three words level in a short sentence. Since early this year, he has been attending the local kindergarten two days a week for two hours. Overall, his level of self-expression, interpersonal interaction, and self-regulation is developing well.

6. 11 Conclusion

The length of each individual child’s clinical trial took seven to eight months and this trial went on for almost two years. There were four therapists involved in the clinical trial. For the description of clinical vignette, the researcher has used the 3rd person (the therapist, or the author) pronoun even when the researcher wrote her own cases in order to provide a standardized description of the session records. Most children responded positively to both conditions, however, the results demonstrate that interpersonal communication and interactions were qualitatively better in the music therapy condition. Two children (C, J) did not respond well to the music therapy condition whereas four children (D, E, F, G) did not respond well to the free play

condition. The issues of control were present in most of the children's cases in both conditions even though the way they displayed those issues were slightly different from each other. None of the children showed identical developmental patterns, but some developed similar patterns, e.g., gestural interaction, as was described in this study. What appeared to be clinically relevant in this study will be discussed more in the following discussion chapter.

CHAPTER 7

DISCUSSION AND CONCLUSIONS

This study investigated the effect of improvisational music therapy on joint attention behaviours including social interaction with autistic children. The study was designed to look at these behaviours in two different conditions, improvisational music therapy and free play, and to use both standardized tools and video analysis of sessions to evaluate changes in joint attention behaviours and social communication skills.

This chapter will review and discuss the results from the analysis of the repeated dependent measures and the evaluation of predefined behaviours in selected session data. The author will relate these findings back to the literature and theoretical framework supporting this study, and will discuss the limitations of the study, the clinical applicability of the findings and potentials for future research.

Since the study employed a complex range of analyses, and in order to integrate the discussion in a pertinent way to each form of analysis, and to avoid repetition, this discussion chapter will be formulated in the same order in which materials were presented in the group results of Chapter 5. The findings from each separate analysis of dependent measures (PDDBI, ESCS, MPIP and finally DVD analyses of selected session data) will be considered, and in each of these sections of the discussion chapter relevant links back to previous research and clinical reports will be made, as well as a consideration of the specific limitations of the results and potential clinical applicability for that particular area of analysis.

The chapter will conclude with a general discussion on the overall value of the study, limitations and clinical relevance in general, the direction of future research, and end with a reflection of the author's research journey.

7.1 Discussion of the results of 'pre', 'in between' and 'post' measures

The order of presentation will be as follows; first, the PDDBI; second, the ESCS; third, sub-group analysis findings based on the PDDBI and the ESCS; fourth, the MPIP.

7.1.1 Pervasive Developmental Disorders Behavior Inventory (PDDBI)

7.1.1.1 Main findings and related theory

The main research question posed in relation to the social approach sub-scale of the PDDBI in this study was; “can parents and professionals identify behavioural changes concerning joint attention (q. 1.5)?”

The PDDBI is an informant based rating scale designed to assess the responsiveness to interventions in children with pervasive developmental disorders including autism, and was completed by the mothers of the subjects, and by the professionals.

Overall, levels of agreement in perception of behaviour between parents (mothers) and professionals appeared to be quite low. This finding was consistent with the study undertaken by the authors of the PDDBI where they also found the parent-professional reliabilities were not as high as professional-professional reliabilities (Cohen et al, 2003).

In this study, levels of agreement between mothers and professionals appeared to be lowest at pre-test, due to much higher scores given by the mothers than the scores of professionals. However at in between and post-test the correlation between them in their scores improved over time, reflecting that the mothers’ scoring was becoming more accurate and realistic.

The differences in pre-test scores may reflect that children behave differently in different situations, but may also suggest some bias in judgement in the coder’s state of mind, especially in the mothers’ case.

The mothers’ influence in the PDDBI scoring

The scores given for the social approach subscale of the PDDBI by the mothers of Group 1 were higher following the music therapy condition than the free play. These results were quite congruent with the results of the total ESCS and session data analysis in terms of change over time. The scores of the mothers from group 2 did not report much difference between the two conditions that the results were inconsistent with the findings of the ESCS and session data analysis.

In some cases, the scores of the mothers seemed to reflect not only on the responsiveness of the child to each condition and the mother’s levels of understanding of the PDDBI scales, but also their expectation, realization, disappointment and despair over their child. For example, the scores of the PDDBI completed by B’s mother at the ‘in-between’ test seemed to reflect her unrealistically high hopes after the music therapy

condition, where there was a dramatic doubling of the scores from the the pre-test. At the posttest, her realization and acceptance of B's quite severe impairment resulted in markedly lowered scores after the free play condition. Yet these were nevertheless still higher than her original pre-test scores. Some mothers verbally reported to the researcher that they recognized more improvement after the music therapy condition than after the free play condition. However, the scores they gave on the PDDBI did not reflect these opinions. This may be due to their level of understanding of the PDDBI scales, and how to accurately and appropriately score them. In fact, some mothers verbally reported to the researcher that they were not able to understand clearly how to score each section of the PDDBI until the post data collection period. In F's case who had free play first and music therapy second, his mother told the researcher that she recognized there were more positive effects in music therapy, however she had given the same scores at the post data collection point (after music therapy) as at the in-between point. She had become much more aware of how severe her child's condition was, and therefore scored less favourably over that period of time.

The whole period of the clinical trials appeared to be a learning process for some mothers, as at in-between the scores of most mothers came closer to the scores of these professionals who were involved with their child's education or therapy, and by post-test, they were closer again.

Professionals' scoring

All the professionals who scored the PDDBI were blind to the treatment conditions and never saw any of the music therapy or the free play sessions during the clinical trials. The scores of the professionals suggested that there was improvement in the behaviours rated by the PDDBI in both conditions. Their scores were in favour of improvisational music therapy over free play, suggesting that the improvement of joint attention skills in children with ASD was larger after music therapy than after free play. The scores of professionals were undoubtedly more objective than the scores of the mothers. Sometimes, there were two professionals involved at two different data collection points in this study (as was the case for four subjects), and in one case three were involved at three different data points (as in the case of subject A) due to the changes in staffing, or changes in the intervention programmes that were being undertaken at the time. Despite this, the scores of the professionals appeared to show consistent patterns of progress, which seemed to be supported by other dependent measures such as the ESCS and session data results. This is probably due to the professional's skills and greater experience in distinguishing pathological and

developmental characteristics of autistic children's behaviours concerning joint attention. The results seemed to suggest that most professionals were able to distance themselves in a more objective way in scoring the joint attention related behaviours in the PDDBI than one could expect from the mothers. This further suggests a conclusion that the scores of professionals were more reliable and valid than the scores of the mothers in the study, even though the mothers were scoring the child with whom they lived on a daily basis.

The recent Cochrane Review of music therapy for autistic spectrum disorder (Gold, Wigram & Elefant 2006) found positive benefits for music therapy in development of gestural and verbal communication. However, the analysis across studies of improvements in behaviour was not significant, mainly explained by the short-term nature of the included studies. In this study, the PDDBI offered evidence that social approach behaviours improved in both conditions, but there was only a slightly greater improvement in music therapy than in free play. This is supported by the Cochrane review in terms of communicative behaviours. The lack of significant evidence in behaviour in general in the Cochrane review is likely due to a small sample, short-term nature of the intervention, and the likely presence of entrenched behaviours, on which it would be ambitious to expect any dramatic changes. Changes may be present in music therapy, and in free play to a lesser degree, but whether those changes and improvements are generalized to other situations still requires further studies.

For example, B's mother commented after music therapy:

“B looks almost normal in music therapy. His behaviour improved at home and at pre-school in special education, but not to the same degree as in music therapy...”

7.1.1.2 Limitation of the PDDBI

The pooled data (figure 5.1 and 5.2) depicted at a descriptive level that both professionals and the mothers were able to identify changes after both conditions. Both professionals and mothers in Group 1 were in favor of the improvisational music therapy over the free play. However, statistics analysis did not find a significant difference. The non-significant difference was found when comparing conditions in both parents and professionals' scores. This may well be due to small sample size, which resulted in low-test power (i.e., low chance of detecting a significant effect even if the therapy was effective). Therefore, the interpretation of the results should be treated with caution and further research needs to be carried out in order to verify the results of the study.

The authors of the PDDBI pointed out the limitations of the PDDBI as follows

(Cohen et al, 2003); first, small sample sizes that makes a limited generalizability; second, ADI-R¹, currently “gold standard” available in the field, was not used for diagnosis of cases; third, the sample was not population based, therefore, may represent certain functioning levels at certain age; finally, most samples were based on middle- to upper-middle class Caucasians with relatively high level of education.

The current music therapy study also has similar limitations, particularly in respect of the small sample size. In future studies, it would be recommended to recruit a larger sample. While the study samples were not diagnosed using the ADI-R, there were nevertheless enough clinical indicators and diagnostic criteria to identify all participants in the study as having autistic spectrum disorder.

7.1.1.3 Clinical applicability of the PDDBI

The PDDBI was both a valid and reliable scale for assessing autistic children’s responsiveness to the two different types of interventions in this study. The PDDBI is easy to use and has two distinctive sections, the maladaptive behaviour section one and the adaptive behaviour section two. For the current research, only the social approach sub-scale was used. For further research, different sections of the PDDBI could be used for measuring different areas of responsiveness. Measurement of self-regulation (emotional regulation) and language skills would be clinically relevant as the dependent variables for longer-term music therapy intervention in children with pervasive developmental disorders including autism. Even though the current study did not include measurement of self-regulation and emerging language acquisition skills in children with ASD using the PDDBI, the individual case vignettes in chapter 6 reported improvement in these areas. As the PDDBI is a standardized tool assessing wide range of developmental areas concerning pervasive developmental disorders, it will be an invaluable tool to validate and evaluate the responsiveness of children with ASD to the particular interventions. It is also relatively easy to learn to administer, and realistically quick to use in clinical practice.

7.1.2 Early Social Communication Scales (ESCS)

7.1.2.1 Main findings and related theory

The ESCS was a videotaped semi-structured observational measure. Since the working definition of joint attention behaviours in the study includes an interactive state

¹ “Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & Le Couteur, 1994) is a standardized instrument that provides an algorithm for the ICD-10 (World Health Organization [WHO], 1993) and DSM-IV (American Psychiatric Association [APA], 1994) diagnoses of autism” (Saemundsen et al, 2003).

of joint engagement that involves the self (the child), another (the therapist), and objects in musical form (instrumental or vocal joint engagement), or in play (toys), the joint attention and social interaction categories of the ESCS were measured as clinically relevant categories.

Main results

In this study the totaled ESCS scores (joint attention and social interaction combined scores) were presented, as well as graphs of the results of the separate analysis of joint attention and social interaction, and the nine individual sub-items of the ESCS. The majority of the inter-observer reliability scores appeared to be quite good (above 0.61 ~ up to 0.97). The results of the ANOVA on pooled total scores suggested that interaction of time with group was significant ($p = .0179$), and that the improvement after the music therapy was better than after the free play at developing early social communication skills in children with ASD. Comparing scores after music therapy with those after free play found a medium ($d = .57$) to large ($d = .95$) effect (95% Confidence intervals ranging from 0.23-0.92 for medium effect, and 0.15-.176 for large effect). Effect sizes were significant at the $p < 0.05$ level.

Relationship with previous findings

The levels of responsiveness to the ESCS test varied from child to child and over time in the study. The pooled and individual results from the ESCS were consistent with the previous findings of autism studies presented in Chapter 2. Mundy (1995) found a distinctive impairment in the development of declarative joint attention skills that young children with autism initiate few joint attention behaviours such as making eye contact, pointing and showing, and respond less often and less consistently to joint attention bids of others than children with other disabilities. However, Leekam & Moore (2001) suggested that joint attention impairment was not absolute. It is rather that joint attention skills in young children with autism may be developmentally delayed in their emergence (Paparella, 2000). The studies (Bono, Daley and Sigman, 2004; Mundy, Sigman and Kasari, 1994) presented in Chapter 2.4.4 suggested that the levels of joint attention disturbance in children with ASD may vary as well.

As in the findings of Mundy, Sigman and Kasari (1994), most children with a relatively high functioning autism (developed verbal language and a higher IQ within the average range) did not exhibit clear deficits in the lower level of initiation of joint attention skills (IJAL), which consisted of eye contact and alternating eye contact.

However, most children with a relatively lower functioning of autism (non-verbal and moderate to severe learning difficulties) exhibited marked deficits in a lower level of eye contact joint attention skills. However, there were also a few exceptional cases where even high functioning autistic children displayed a few eye contacts at the pre-test ESCS trial.

It should also be noted that majority of children, including high and low functioning autistic children, showed marked improvement in the lower level of eye contact joint attention skills (IJAL) after the music therapy condition than after the free play condition in the current study. Improvement in visual joint attention skills of children with ASD after the music therapy condition was one of the most noticeable changes in the study, which was also congruent with the findings of the session data analysis throughout the trials and across the cases. Gaze avoidance in children with autism is a frequently reported characteristic of behaviour, and while it is not identified as core impairment in itself, it is part of a number of deficits that are presented in impairments in social interaction, a core category impairment of ASD. The developmental implication of facilitating spontaneous eye contact behaviours during the interaction with another person in autistic children is important in terms of developing and learning skills in social communication, social interaction and language acquisition. This will be elaborated more in a discussion of the session data analysis.

Unlike the marked improvement of eye contact joint attention skills shown in the study, almost all children failed to exhibit and to show improvements in higher levels of gestural joint attention (pointing and showing). This finding was also congruent with Mundy, Sigman and Kasari's study (1994). Concerning responses to joint attention bid higher level (RJA; poster presentation), verbal and high functioning children with ASD responded better than non-verbal low functioning children with ASD. The results of each sub-scale of social interaction measures were also quite congruent to the previous findings. Looking at individual scores of the ESCS, most children did not exhibit teasing behaviour during the ESCS tests in this study. Teasing behaviour is a very good example of the concept of the theory of mind (ToM) and what degree of influence one's own action has on another person. Therefore, it is not surprising to see there was almost complete lack of teasing behaviour in children with ASD in the study.

There are many studies in both normal infancy and autism stating that joint attention skills are closely related to the later development of language acquisition. Better joint attention skills (both initiation and response of joint attention) were associated with better receptive and expressive abilities (Mundy et al., 1986; Mundy, Sigman, and Kasari, 1990; Sigman & Ungerer, 1984). The clinical vignette documented

within the case study material in Chapter 6 described many such cases during the music therapy sessions than free play sessions. Some studies (Bono, Daley and Sigman, 2004; Siller & Sigman, 2002) specifically indicated that children who responded positively to the joint attention bids of others (RJAH) made the largest developmental gains in language. In this study, many children responded positively to the joint attention bids of others (RJAH) more so when evaluated after the music therapy condition than after the free play condition. Some non-verbal low functioning children did develop some language skills during and after the clinical trials of this study as well, which seemed to support the claims of these studies above.

The ESCS results suggested that music therapy intervention was especially proven effective in improving lower levels of eye contact joint attention skills and responses to joint attention bids.

While the results of current study indicated that joint attention disturbance in young children with ASD was sensitive to the effects of improvisational music therapy intervention, the results also indicated that some fundamental aspects of joint attention and social interaction deficits in children with autism will remain largely unchallenged such as IJAH and ISITs. Therefore, these findings will enable the clinicians to have a more precise understanding of intervention effects on the children, which is important for the future development of the use of music therapy as a treatment of children with ASD.

Relationship to previous music therapy findings

In the recent Cochrane review of music therapy intervention with children with ASD, Gold, Wigram and Elefant (2006) pointed out that improvisational music therapy offers premises for communicative behaviours, such as joint attention behaviours to develop including eye contact. Holck (2004b) and Wigram & Elefant (2006) cited studies by Bunt (1994) and Plahl (2000) reporting the evidence of increased visual attention in connection with musical turn-taking activity with children with severe communication difficulties. Although there are not many music therapy studies explicitly dealing with the effects of improvisational music therapy on autistic children's joint attention skills, there are many clinical reports and a few systematic research studies in the music therapy literature that present evidence as a more general level of improvement of social interaction and communication for the facilitation of joint attention skills (Farmer, 2003; Howat, 1995; Oldfield, 2003; Robart, 1996; Wigram; 2002). Those studies are highly relevant to this study since the working

definition of joint attention in this study includes not only traditional visual joint attention, but also an interactive state between the child and the therapist through either objects, or a musical form.

Edgerton (1994) reported a consistent increase in communicative behaviours over ten sessions during improvisational music therapy with eleven children with autism. Experienced clinicians in improvisational music therapy have often described ‘active music making processes between the child and the therapist’ leading to mutually shared expectation from their interactions and the development of mutual understanding of each other’s action as not only meaningful, but also enjoyable (Alvin and Warwick, 1991; Brown, 1994; Holck, 2004a; Robarts, 1996; Saperston, 1973). Without the development of certain levels of joint attention skills, mutually shared expectation and understanding of each other’s action would not be possible.

7.1.2.2 Limitations of the ESCS

The ESCS was developed by a group of researchers in the early 1980’s in order to assess the emergence of nonverbal social communication skills in the first two years of life. Peter Mundy stated in his homepage that the ESCS has proven to be very useful in the study of both early typical and atypical social development and is presently used in at least ten university laboratories in the United States, as well as in laboratories in France, Norway, and Australia. Although the ESCS has been used for more than two decades, it has been revised and refined a number of times. First, the author obtained the 1996 version of the ESCS manual (Mundy, Hogan, & Doehring, 1996), and then later 2003 version (Mundy, Delgado, Block, Venezia, Hogan & Seibert).

Limitations of coding system: The ESCS appears to be a method still in the process of development. For example, some of the ESCS tasks were measured in the older versions, but not measured in the 2003 version, while other tasks were still included in the new version. The coding system has been also changed, but some researchers, who do not belong to Peter Mundy’s group at Miami University, still use the old coding methods, which belonged to the earlier version of the ESCS manual. There seemed to be lack of consensus in coding methodology, which caused some confusion over the coding method.

Limitations of guidelines: The guidelines for the administration of the ESCS were also less than clear and explicit. The ESCS manual advocates 15~25 minutes administration of the ESCS, and video demonstrations (2003 version) of the ESCS administration to the children usually lasted about 15 minutes. The authors of the 2003 version of the ESCS manual did not specify guidelines when applied to the children

with special needs including autism. After administering the ESCS with the first three children in the similar way of 2003 version of the video demonstration, the researcher sent the video to the autism researcher (Siller, 2004; personal correspondence), who had an expertise in using the ESCS with autistic population. Siller cautioned about the assessment for its fast presentation, and not giving enough time for children to respond in each toy presentation. As some children with ASD tended to show delayed responses compared with non-clinical children, a longer duration for the ESCS administration (25 minutes to 30 minutes) was advised. Therefore, it took some time to find the optimum way of administering the ESCS. There was a satisfactory resolution to this, ensuring improved consistency in presentation as the study went on.

Invalid measure: The researcher also recognized from articles of autism studies using the ESCS that none of the articles reported RJAL (responding to the joint attention bid lower level: The presentation of the picture book task). When I asked other researchers who used the ESCS on why they did not report RJAL, none of them seemed to know the reason clearly until the researcher asked one of the authors of ESCS (Prof. Peter Mundy at Miami University). The following was Prof. Mundy's response;

“the book task has not been very reliable or valid in our studies. It is very difficult to accurately rate following point versus orienting to hand movement versus spontaneous scanning on the book task. So its' reliability and validity as measure of joint attention is too low for most purposes.”

Even though they found RJAL was not reliable or valid in their studies, they did not eliminate the task. What the researcher has found in this study was that the book task was no more difficult to code than the poster task (RJAH). Therefore, the result of RJAL was included and reported in this study. However, this was also one of the confusing factors in the ESCS. If the group of researchers who created the ESCS found RJAL was no longer a reliable and valid measure, they should have eliminated the book task from the ESCS manual.

Scoring guidelines: The ESCS consists of a frequency measure in three, mutually exclusive behavioural categories (joint attention, social interaction and behavioural request). Since only joint attention and social interaction categories were used as clinically relevant measurements for the study, there were nine sub-scales with different ranges of scores. As described extensively in Chapter 4 to explicate the reasons for summing up the total ESCS scores in the study, it was decided to use the total ESCS scores. It was important not to have too many variables, especially when the sample in the study was so small (Cohen, 1990). Regarding this question of how and what to combine in the ESCS, neither the ESCS manual, nor Peter Mundy gave clear guidelines

on this matter. The simple way of adding up raw scores to a total score is in conflict with Peter Mundy's recommendation, but he did not recommend the alternative combination method (standardization) either. Therefore, the most simple and straightforward way of adding up the raw scores to the total sum of scores was chosen. In doing so, IJAL (initiation of joint attention lower; eye contact and alternating eye contact between the object and the tester) got by far the strongest weight in the total score.

Characteristics of the ESCS administration; In order to administer the ESCS, the tester needs the child's cooperation to sit and to pay attention to the tester's presentation of play materials during the ESCS test. This meant that the ESCS test itself required certain levels of joint attention and of self-regulation by the child being tested. Before the commencement of the study, the ESCS was carried out with normally developing infant's age between eight to thirty months in the clinic and most of them were able to attend the ESCS test, especially when their mothers were around.

For some of the high-functioning verbal children with autism, the toys presented during the ESCS were not interesting enough to hold their attention and cooperation long enough, which resulted in a child's frequent request to put the toys away and leave their chair. For low functioning hyperactive non-verbal children with a short attention span, the ESCS test became an ordeal for the mothers and the children. Toys were attractive enough to hold their attention, but they were not able to control their impulsive behaviour by sitting still and paying attention to the toy presentation by the tester. The mothers had to hold them in order to assist the test to be carried out by the tester. However, for some cases when children began to throw temper-tantrums and disruptive behaviours, the ESCS was difficult to complete.

The most positive findings of the ESCS evaluation were that most children were able to attend and complete the ESCS at the post data collection period with aid from their mothers. Being able to attend the ESCS test itself was certainly a very important indicator of the development of joint attention skills and self-regulation.

During the administration of the ESCS, the researcher found out that the responsiveness of the child to the ESCS test was sometimes dependent on the child's mood on the day of the ESCS administration, as well as some additional inducements that were offered to sustain their cooperation long enough to complete the tasks. For example, two non-verbal and low functioning children with extremely short attention span who were prone to throw temper tantrums, were pacified when given sweets. When they had a candy in their mouth, they were more able to attend to the tester for a longer duration than usual without throwing the usual temper-tantrum.

Limitations of real world research: There were practical limitations that were beyond the control of the researcher. Sometimes, difficulties in time arrangement of ESCS administration between the researcher and the research assistant (who did most of the ESCS administration and who was blinded to the order of conditions) and the children occurred. In such cases, the researcher did the ESCS administration by herself.

7.1.2.3 Clinical applicability of the ESCS

The ESCS is rather a complex scale to apply in everyday clinical practice. It took a long time to learn the proper way to administer the ESCS to the autistic population as described in Chapter 4. In addition, it took an even longer time to learn how to analyze and code the behaviours of children shown during the ESCS test. The researcher consulted the infant psychology department and specialists at Seoul National University, who had used the ESCS as the primary research tool for their infant research in Korea, in order to learn how to code the ESCS results. With this advice, the researcher was able to create her own coding sheet into a more practically manageable form than was suggested in the 2003 version of the ESCS manual.

As the ESCS addresses, however, different types and levels of early social communication skills in normally developing infants and essential features of the social pathology of autism, it is a very useful tool for research purposes, especially when the focus of the research is on the development of non-verbal social communication skills. The ESCS test was proven especially useful in distinguishing higher functioning and lower functioning children's specific deficits in joint attention. The ESCS might be also useful addressing non-verbal communication skills and responsiveness to interventions in adolescent and adult learning disability, especially when the client's mental age is between one to three years old).

7.1.3 Sub-group analysis findings based on the PDDBI and the ESCS

Sub-analyses on the three sub-groups of the samples were undertaken based on the PDDBI scores made by both the mothers and the professionals, and the ESCS scores. These three sub-groups analyses were;

- 1) comparing verbal, relatively high-functioning with non-verbal, low functioning children
- 2) comparing younger children with older children
- 3) comparing children with mild to moderate autism with those with severe autism.

The findings of each sub-group analysis will be briefly re-presented and the implication of each finding will be discussed.

7.1.3.1 Sub analysis 1: Comparing verbal children with non-verbal children

Main findings

Figure 5.8 in Chapter 5 of sub-group results (verbal versus non-verbal children) revealed that the non-verbal children's performance level concerning joint attention behaviours in all measures (the PDDBI-parents/professionals, the ESCS) appears to be lower at all three time points ('pre, in between and post' treatment) than the verbal children. The degree of the non-verbal children's improvement seems to be parallel that of the verbal children. Most children appeared to have improved more after music therapy than after free play. A few children (two verbal children in Group 2) showed a more or less similar level of improvement in both conditions. However, one verbal child in Group 2 had a change of medication during the music therapy condition, which might have influenced the results. The ANOVAs of the PDDBI professionals and parents do not suggest that the level of verbal functioning has a significant impact on the responsiveness in children with ASD. However, the level of verbal capacity had nearly significant value ($p = .0600$) in PDDBI professionals.

The significant effect of verbal ability can be seen in the total ESCS result ($p = .0020$). This suggests that the more verbally able the child is the higher scores in the ESCS and perhaps the better potential to develop joint attention skills. The impact of verbal capacity on the responsiveness of the children may appear more significant given a larger sample.

Relationship with previous findings

To the current knowledge of the author, there is no intervention study published using the PDDBI to distinguish differences in responsiveness to interventions between verbal and non-verbal children with ASD. However, Mundy, Sigman and Kasari's 1994 study looked at the effects of mental age and IQ on the joint attention skills of children with autism using the ESCS as measurement. The results of their study showed that children with different mental ages and IQ's have different levels of impairments in joint attention skills based on the ESCS test. There are studies showing relationships between the amount of intervention and joint attention skills in the prediction of language development (Sigman & Ruskin, 1999; Siller & Sigman, 2002). Acquisition of

language skills itself represents some level of joint attention skills (see chapter 2.4.4). Verbal autistic children with higher IQ and mental age than non-verbal autistic children clearly have better joint attention skills to begin with, therefore might respond better to interventions and might have better potential to develop even greater joint attention skills.

Limitation of the findings

The current study has a very small sample that cannot truly represent the whole autistic population. Moreover, the results from the PDDBI do not support the presumption that verbal children might respond better to music therapy intervention. Therefore, further investigation with a larger sample is needed and it would be clinically relevant to find out whether the responsiveness differs between verbal and non-verbal children with ASD.

7.1.3.2 Sub-analysis 2: Comparing the younger children with the older children

Main findings

Figure 5.9 in Chapter 5 showed that most younger children in both groups (1 and 2) showed or slightly more, or even marked, improvement in all measures (PDDBI-professionals/parents, the ESCS) after music therapy, yet showed slight improvement, or even regression after the free play condition. Some graphs (the PDDBI-parents/professionals, the ESCS of Group 2; figure 5.9) of older children in Group 1 (two children) and Group 2 (only one) in most measures, tended to be inconsistent. The ESCS results of the older children in Group 1 showed slight improvement after the music therapy condition and marked regression after the free play condition.

In general, the results from the graphs in figure 5.9 suggested more marked improvement in the music therapy condition in younger children, whereas the graphs of the older children indicated conflicting information. However, the ANOVAs of the PDDBI and the ESCS did not suggest that the age difference had a significant impact on the responsiveness in children with ASD, except the PDDBI-parent's case where a significant two-way interaction of time with age ($p = .0329$) was found. However, it did not indicate anything about the effect of music therapy versus the free play condition.

Relationship with previous findings

It is well-known fact that early diagnosis and early intervention improves the prognosis for children with ASD (Bono, Daley and Sigman, 2004; Freeman, 1997; Howlin, 1998; Kasari 2002; Mundy & Crowson, 1997). The current study also

indicates that the younger the child is, the better and more straightforward responsiveness was shown towards the music therapy intervention than towards the free play intervention. This finding supports the claims of Mundy and Crowson's study (1997) where they suggested children age between two to four would benefit the most from the interventions. Their claim was supported by brain research by Zilbovicious et al (1995) as described in Chapter 4.2.1. The finding is also consistent with the finding of Gold's (2003) study of music therapy in child psychiatry wherein he found younger clients respond best to music therapy, when looking at the ages between 3 to 19 years old. However, the literature search did not reveal any study that reported looking at differences in responsiveness between the younger (three to four year old) and the older (five to six year old) children with ASD in either music therapy, or other intervention studies. As autism is a complex developmental disorder showing huge variety and individuality across all ages and abilities, it would be clinically relevant and highly valid to find out whether age differences play a particular role in the responsiveness to predominantly non-verbal and musical intervention within music therapy. One might expect that in music therapy, as in other interventions, the earlier the intervention can start, the less entrenched and rigid behaviours have become, and the more accessible the child.

Limitation of the findings

Figure 5.9 seemed to suggest that the younger children with ASD responded better to the music therapy than to the free play condition without many conflicting results whereas the older children's cases seemed to suggest conflicting information. However, we cannot generalize these results since the sub-groups do not involve equal number of matched children, nor it is a big enough sample. Moreover, the result of repeated measures ANOVA suggested that age did not appear to have an influence on the responsiveness to the music therapy versus the free play condition.

7.1.3.3 Sub analysis 3: Comparing children with mild to moderate autism compared with children with severe autism

Main findings

In general, the children (figure 5.10 in Chapter 5) with mild to moderate autism showed marked, or slightly better improvement after music therapy in all three measures (the PDDBI professionals and parents, and totaled ESCS scores) and then showed either similar or slightly less improvement, or even regression after the free play condition. The PDDBI graphs (figure 5.10) of children with severe autism in

Group 1 showed slightly more or marked improvement after the free play condition than the music therapy condition whereas the ESCS graph showed slight improvement after the music therapy condition and marked regression after the free play condition. The graphs of children with severe autism in Group 2 indicated improvement that is more pronounced after music therapy than after the free play condition except the PDDBI-parents where the difference between music therapy and free play was not significant. The results of the children with severe autism provided inconsistent information.

In general, the data presented in graphs suggests the level of responsiveness was greater in mild to moderately autistic children and the effects of music therapy seems more pronounced than the effects of free play. The level of responsiveness in children with severe autism also generally suggested the effects of music therapy was more positive than that of free play even though the PDDBI results in Group 1 was contradicting this suggestion. One has to note that the PDDBI is the rating scales based on adults' perception of the children's behaviour, whereas the ESCS is the semi-structured test scores based on the children's performance concerning early social communication skills. The ESCS results in children with severe autism seemed to suggest the more positive effects of music therapy than that of free play.

Relationship with previous findings

The result of this study seemed to suggest that children with a milder form of autism may respond better to improvisational music therapy than children with severe form of autism. This appears to be a more predictable results since the more severe autism the child has, the less responsive the child was expected to be to his/her environment and to the people around him/her. However, the current literature search did not find any study focusing on the effect of differences in severity of autism in children to the responsiveness of interventions.

Limitation of the findings

We cannot generalize these results since the sub-groups do not involve equal numbers of matched children, and it is based on a very small sample. The ANOVAs of PDDBI professionals suggested that the interaction of severity in autism with group appeared to be significant ($p = .0232$). In PDDBI scores, the results approached significance in severity (parents, $p = .0880$; professionals, $p = .0638$). In the ESCS total, the result approached significance in time with severity ($p = .0557$). If given a larger sample, the significance may emerge when comparing the level of severity in autism. However, these results do not distinguish music therapy versus free play effects.

Therefore, further study is needed in order to find out the differences in responsiveness between children with a milder form of autism and children with a severe form of autism towards music therapy intervention.

7.1.3.4 Conclusion and clinical applicability of sub-group results

The results of sub-group analysis suggested that the effects of music therapy were generally more positive than that of free play on sub-groups. The results of sub-group analyses also suggested that verbal, high functioning children appeared to respond better than non-verbal, low functioning children; the younger children seemed to respond better than the older children; children with milder form of autism seemed to respond better than children with severe form of autism. Although there were exceptional cases and somewhat inconsistent results among these sub-group results, it seems the ‘better (younger, more able and less autistic)’ group of children showed they gained more from these trials in both conditions than ‘low functioning, severely autistic and older’ children, which might be a somewhat predictable result. However, the clinical implication for even the small improvement in low functioning and severely autistic children in comparison to larger changes in the ‘more able’ group of children should not be overlooked. However, the results of repeated measures ANOVA did not fully support the above findings due to the very small sample sizes.

As the sub-groups presented in this section have even smaller numbers with un-evenly matched children, any results here should be treated with caution. However, it would be not only interesting, but also clinical relevant to find out more of these sub-group effects on the responsiveness of improvisational music therapy intervention since this will show clearer direction to clinical applicability. Howlin (1998) pointed out that highest ‘success’ rate for any intervention is about 50 % in the area of autism. She went on to describe that no single therapy helps everyone, no single therapy helps everything, and it is hard to know who will benefit from what intervention. Kasari (2002) also pointed out the impossibility to predict, which children will need what type and intensity of treatment for which developmental behaviours and needs. Moreover, given the information that not all interventions work for all children with ASD including music therapy, the further music therapy studies that determine for whom the treatment is most effective and what kind of outcome is expected is not only needed, but also necessary to carry out in the near future.

7.1.4 Mother Play Intervention Profile (MPIP)

7.1.4.1 Main findings

The MPIP was an unstructured, non-standardised observational measure of mother child play recorded on video in the home situation. The results of a repeated measures ANOVAs found that differences over time, between groups and interaction of time with groups were not significant factors, with the exception of ‘the degree to which the mother is active in play’. The results suggested that the patterns of interaction between the mother and the child were already well established and there were little changes over time, even though there were subtle changes measured in ‘the degree of mother being active in play’.

The video analysis revealed that most mothers of children with ASD in the study provided an overall structure in the play between the child and themselves by offering play material and giving directions on how to play. They often actively led the play, initiating and offering social cues into their interaction with the child. There were some mothers who were able to lower their level of structuring, initiation and active directions and to be more responsive to the behavioural cue and focus of attention of the child (note the cases of A, F, J) over time during the trials. However, the majority of the mothers were quite directive in their playing with their child throughout the trials and their children displayed almost no initiative in interaction with their mothers. What the MPIP did not measure, however, was the responsiveness of each child to its mothers. More than half of the children did show increased responses towards their mother’s initiatives and social cues during the free play at home. Due to the increased responsiveness of the children, some mothers were able to lower their levels of directiveness towards their children. However, as stated before, the responsiveness of children was not measured by the MPIP in the study.

7.1.4.2 Relationship with previous findings

The findings are consistent with the previous findings of autism studies. Siller & Sigman’s study (2002) pointed out the contrast between how parents of normally developing children usually behave, and how parents of autistic children tend to behave and how they are often advised to behave. Parents of children with autism appeared to be more controlling and directive (Kasari, Sigam, Mundy & Yirmiya, 1988; Siller a& Sigman, 2002) than the parents of typically developing children. This may be the result of the child’s level of disability that parents are trying to compensate by becoming more directive and controlling.

A recent Korean study (Kim & Kwak, 2004) examined responsiveness and

initiative in mother-infant interaction in the non-clinical population. 91 infants and mothers were observed in their dyadic free play time. This study found that majority of Korean mothers were quite directive that they often introduced play materials, intervened child's play in order to re-direct the child's attention, show new material and develop the play with their (mothers) own intention. There was also a group of mothers (less than one third of total numbers) who were passive during the free play with their baby. The study found out that the directive mothers who tended to lead the play interaction with their own intention often appeared to ignore or miss the behavioural cues and initiatives of their baby. The passive mothers, who did not intervene as frequently in the child's play, appeared to be more attentive and responsive towards their baby's behavioural cue and initiatives. Korean mothers' directiveness towards their baby may be due to the Korean culture. Traditionally, Koreans consider 'education' very seriously, and one of the very important roles of parents is to provide the best education one can give to one's child. This often starts from the mother's womb, wherein pregnant women do their best to surround themselves with the best environment for their baby and to maintain their physical and mental health. In Korea, this is called "Taekyo" meaning 'education in the womb'. This early effort to mould the good character of their child seems to continue after giving birth to their baby. Therefore, the results of Kim & Kwak's study (2004) may be the evidence of a continuation of the early intervention effort of Korean mothers in that culture. According to this study, mothers of autistic children in the study were not behaving any more differently from mothers with babies in the non-clinical population in Korea. However, even in the non-clinical population study, the authors suggested that directive mothers did not benefit their infant's development in social cognition. The authors claimed that infants' responsiveness and initiatives could be important developmental milestones for the development of social cognition. The more passive the mothers were, the more responsive they were to their baby's initiatives for interaction, therefore, more able to induce a higher level of social cognitive behaviours in their infant.

El-Ghoroury and Romanczyk (1999) examined play interactions of family members towards children with autism. Nine families (fathers, mothers and siblings) were observed in dyadic play interaction with the child with autism. They found that parents (mothers and fathers) were more actively initiating play behaviours, while children with autism initiated more interactions towards siblings than towards parents. Results of the study suggested that parents may compensate for their child's disability level by initiating more play interaction. The implication of these results is that children with autism are more able to initiate when there was less demand on them to interact.

These studies indicate that the adult's sensitive, attentive and responsive behaviour towards the child's focus of attention, and behavioural cues (whether the child is autistic or not), promotes not only the interaction between them, but also the child's initiatives for the further interaction. These results are consistent with the findings from the analysis of session data in Chapter 5, and the case studies in Chapter 6. Children in this study displayed more initiation of engagement behaviour in the unstructured part of the session than structured part of the sessions. They also displayed defensive behaviours when confronted with interpersonal demands made by the therapist mostly in the structured part of the sessions.

Warwick (1995) reported a research project involving mothers in actual music therapy sessions. She described how mothers were over-intrusive to their child's space during the session because they felt their child should be more actively participating throughout the session. She also described that mothers found the presence of the video camera difficult to deal with. Perhaps mothers in the current study may have also felt compelled to be active in their free play at home, even though the researcher made sure that the study was looking at how the child and the mother usually related to each other at home. There could be many other potential explanations for why mothers acted the way they did, but that area of enquiry is too extensive to incorporate in the scope of this thesis, and was not part of the original research questions.

However, the findings of this study and previous studies indicate that it is important to teach parents how to pace their play interaction with a child with ASD, and to offer an environment that allows their child to take a greater initiative in interaction. Some mothers learned how to play with their child via observing every sessions of this clinical trial and applied their learning during the free play at home situation, while some mothers recognized the difference between their way of playing and the therapist's way of playing, but were still not able to apply what they noticed to their own play time with their child with ASD.

7.1.4.3 Limitation of the finding

Since there were only 10 participants in the study and these participants do not truly represent the whole autistic population, the findings are not conclusive, but need further study to confirm them.

7.1.4.4 Clinical applicability of the MPIP

Although the MPIP is quite easy to apply and supplied useful additional

information on how children are at home with their mothers and how child-mother interaction changes over a certain period, clinicians need to have additional resources in order to carry out the MPIP. Therefore, it may not be applicable for everyday clinical practice for music therapists, who are employed mainly to carry out clinical work without additional resources for hiring and training the assistant, for home visiting, etc. However, for research purpose, the MPIP is useful especially when the research focus involves the quality of mother-child interaction and the changes of it over time. Perhaps, for further study, one may consider to include an item for responsiveness of children towards their mother's intervention.

7.2 Discussion of results in session analysis

Throughout the clinical trials across the cases, treatment protocol was used and the free play condition was carried out as a comparable condition with to the use of improvisational music therapy as a treatment intervention. The sessions were divided into two sections (unstructured and structured) (see chapter 4 and treatment manual, appendix 10.1)

The session analysis consisted of frequency and duration data in three different areas; joint attention, social invitation, and salient features of music therapy and free play conditions. From the analysis undertaken on the selected dependent variables, the pooled and individual results were markedly in favour of improvisational music therapy than free play, suggesting improvisational music therapy was more effective at improving joint attention, responses to social invitation (initiation of interaction by the therapist) and social interaction behaviours in children with ASD. In order to establish the validity and reliability of these results, it is important to establish that objective, independent scoring of events be undertaken to correlate with the session analysis done by the researcher. The Inter-observer level of agreement between the independent observer and the researcher was very high on most items, ranging between 0.90 ~ 0.98 (except two items), validating the reliability of the data. This also lent considerable weight to the researcher's specific definitions of each target behaviour in the coding guidelines, and suggests they were precise and accurate enough for the independent observers to carry out reliable coding of events and behaviours. Besides the importance of precise definitions, it is also important to note that the training of the second coder took more than three months (one or twice a week for 5 hours each), and this added to the precision and accuracy of observer's coding of behaviours. In future studies, the

importance of precise definitions of musical and non-musical behaviours that represent more broad categories of behaviour such as social interaction and joint attention needs to be considered for a precise method and design, and this is quite possible in music therapy research.

As there were a lot of data in the session analyses, the pooled results will be briefly re-presented and theoretical aspects, limitations, clinical applicability and future direction of research will be discussed

7.2.1 Discussion of results

Discussion of results will follow the following order and groupings;

- 1) Development of joint visual attention
- 2) Attunement as a motivational factor for joint attention and spontaneous engagement
- 3) Children's responsiveness towards interpersonal demands
- 4) Social interaction
- 5) Fidelity of treatment
- 6) Common features in clinical vignettes of individual cases
- 7) Salient features in both conditions

7.2.1.1 Development of joint visual attention

As the implication of eye contact with another during social interaction is vast for the development of children, joint visual attention (spontaneous eye contact) was measured when the child was engaged with the therapist through either music, or toy play.

Main findings

The pooled results of eye contact frequency and duration revealed that the effect of improvisational music therapy was far greater than that of free play at facilitating more joint visual attention (eye contact). A repeated measures ANOVAs revealed a highly significant effect ($p < .0001$) comparing music therapy and free play both in frequency and duration measurements. The results are consistent with the results of the ESCS, especially with IJAL (initiation of joint attention low; eye contact / alternating eye contact between the object and the tester) and some of the PDDBI results. Although eye contact occurred far less in the free play condition, there were rare moments of musical synchronicity events between the child and the therapist in the free play. When the nature of the interaction between them was predominantly musical (i.e.,

singing, vocalization, rhythmic and dynamic interaction), a lot of spontaneous eye contact, joy (smiling, laughing) occurred as well (see the case studies of B, E and J).

Relationship with previous findings

During the discussion of the results of the ESCS, some aspects of previous findings regarding IJAL were discussed extensively. In order to avoid repetition, the same aspects will not be repeated (see 7.1.2). Gaze avoidance among children with autism has been an area of controversy in autism research (see chapter 2.3). While Richer & Coss (1976) found that autistic children did not readily make eye contact with others, the study by Mundy et al (1986) indicated that the children specifically lack the ability for alternating their gaze between a person's face to an object. Other studies indicated that autistic children attended to their social partners' face no less than their comparison group with similar mental ability (Kasari et al, 1990; Sigman et al, 1986), while Joseph & Tager-Flusberg's study (1997) suggested that autistic children attended their mother's face only half as much as comparison group.

Alternating gaze: Since eye contact and alternating eye contact were measured as 'eye contact' collectively, this study did not provide differential evidence between these two sub-measures of eye contact. Nevertheless, the researcher noticed that the musical response of the therapist to the child's playing often brought alternating eye contact events. For example, in the first session, B hit the drum while watching the drum, then looked at the therapist when he heard the therapist's response with the piano playing. He looked pleasantly surprised and smiled, and hit the drum again and looked the therapist. This was repeated quite a while. Although in strict terms, the alternating gaze of IJAL (Initiation of Joint Attention Lower behaviour) should happen spontaneously without external stimulation made by the therapist, the premise of music therapy encouraged alternating gaze between the object of the child's interest and the therapist. With some children, this was evident through the ESCS test after the music therapy condition as well.

Gaze and gaze avoidance: Bunt (1994) and Plahl² (2000) reported evidences of increased joint visual attention in children in their research. Bunt (1994) also used play sessions with toys as a comparison condition to music therapy sessions in his research (The Hackney project). Although his study included children with profound and multiple learning difficulties, the results bear some resemblance to the current study, finding that while children played longer with toys (longer object play) and looked at

² Christina Plahl's PhD study (2000) was written in German. The author refers to her study only through Holck (2004b) and Wigram & Elefant (2006)'s text.

toys longer than instruments, interpersonal engagement was reported as better, with children looking at the therapist more in the music therapy than in the play sessions. The findings of Bunt are partly consistent with some cases of this study, especially K's case (see the mother's comment). In the free play condition in this study, children were able to play alongside with the therapist, but they often appeared to play in a solitary way, looking at the toys for long time, but with far less spontaneous eye contact directed towards the therapist. This may be due to the specific characteristics of toy play that children found it hard to share their choice of toys with the therapist whereas 'music' is essentially relational especially when the therapist used 'controlled musical attunement' in relation to the child. Bunt also reported that there were more 'looking away' from the therapist in the music therapy than in the play sessions. This study did not measure 'looking away' behaviour in children. However, the fact that children made more eye contact with the therapist during the music therapy condition may be the precise reason why they made more 'looking away' behaviours. When there was no 'looking at' the therapist, there would be no need to 'look away' from the therapist. Brazelton and his colleagues (1974), and Stern (1974) in their infant-mother research claimed that the regulation of gaze ('looking at' and 'looking away') provides young infants an important means to modulate the effect of external stimulation on their internal state. As children with ASD have severe difficulties in relating and communicating with others, the alternating 'gaze' and 'gaze avoidance' during the active musical interaction may be the sign of their own self-regulation towards external-musical stimulation, which is often embedded with rich interpersonal and emotional experiences. Brazelton and his colleagues (1974) gave an important insight to music therapists working with children with severe communication difficulties, including autism by emphasizing the importance of developing the therapist's sensitivity to the child's 'capacity for attention and his need for withdrawal'.

Earlier Hermilin and O'Connor's extensive experiments (1970) with autistic children provided an interesting insight too. Although many people felt that autistic children avoided eye contact, the results of the experiment showed that they did not avoid eye contact. The problem was not gaze avoidance, but rather 'gaze' was not used communicatively in relation to people. Disturbances in timing in social interaction was noticeable where the children were found to neither 'look away' nor 'meet the gaze' when at the right timing.

Holck (2004b, p.45) also states; "in a well-functioning dialogue, the nonverbal and often implicit visual and auditory cues ensure good continuation without interruptions or overlapping speak". Could the process of improvisational music therapy

engender the coordination of gaze regulation with the right timing in children over time.

Contextual characteristics of music therapy sessions enhancing more eye contact; The author observed that spontaneous eye contact was occurring much more in the music therapy condition than in the free play condition with toys. In most trials during the free play condition, the therapist often stayed alongside of the child, whereas the context of music therapy allowed physical distance between therapist and child while still being engaged musically. Typically, when the child plays the drum, the therapist can play the piano and simultaneously sing, giving enough physical space between them. In many cases, this was the point when children began to look at the therapist in music therapy. However, when two participants played the same instruments alongside each other, spontaneous eye contact occurred far less, unless the musical relationship had developed very well over a period of time. When playing with toys, it is very difficult to play with someone from a far distance, especially when one is playing with children who are often self-absorbed with solitary object play. Perhaps allowing more physical space between the child and the therapist, and the ‘response evoking techniques’ (Holck, 2002b) the music therapists used had a synergy effect on the increase in eye contact during the music therapy condition.

Visual referencing and anticipation at the right time in musical relationship: Saperston (1973) described how the attentive use of improvised music to the autistic child’s physical movement resulted in increased eye contact among other behavioural improvements. Wigram (2002) reported spontaneous ‘visual referencing’ by an autistic boy (the case of Joel) during the improvisational interaction through a piano duet, especially when Joel was doing something a little bit ‘naughty’ or provocative. Robarts (1996) also described an occasion (p. 156) where she was able to engage Colin (three and a half year old boy with autism) when she sang about what he was doing. Colin responded by looking at her. She also reported increased attention with accompanying anticipation of what they were doing musically. Wigram (2002) also reported anticipatory action by Joel in the piano duet. In improvisational interaction in music therapy, anticipation often comes with spontaneous eye contact and a heightened sense of pleasure. Holck (2002a, b) used the term ‘commusical interplay’ to describe characteristics of musical and communicative interaction in music therapy. She claimed that music therapists use ‘response-evoking techniques’ through appealing musical sounds in relation to the child. Eye contact was often the response to what the therapist did in relation to what the child did, or how the child was in that precise moment. The author observed many times that when children perceived what the therapist was playing was somehow connected to their own musical, or non-musical expression and

intention, and also emotional contents of that expression, they often reacted with surprised delight at first, and then began to explore musical interaction further with increased eye contact (often visually referencing to how the therapist was responding to their own playing) and often took the full lead of that interaction (case of A, B, E, H, G, K). This kind of pleasurable interaction with the child's own anticipation (joint interaction history, Holck, 2004a) often appeared to bring spontaneous eye contact by the child, evidenced in the current study.

Spontaneous eye contact is part of what the author calls 'musical projective identification' phenomena in improvisational music therapy, which is fundamental for social learning.

Aspects of social learning: Many music therapy clinicians describe either explicitly or implicitly that the process of improvisational music therapy offers a premise for social learning (Alvin & Warwick, 1991; Nordoff & Robbins, 1971a, 1977; Robarts, 1993, 1996; Saperston, 1973; Wigram, 2002; Wigram & Gold, 2006). Social learning is fundamental for many aspects of development; emotional, cognitive and language development. For example, the process of learning in conventional schoolwork also requires appropriate 'looking' at both objects and the teacher. Without the coordination of simultaneous looking and listening both at the objects (or events) of shared attention and the person (or people) who are involved with us at the right timing, one hardly learns anything properly. Therefore, the implications of the findings from this study suggest that improvisational music therapy not only facilitates more 'looking' and eye contact than free play, but also coordinates listening and participating at the right timing in a musical relationship, therefore facilitating continuous social learning. The extent to which increased eye contact in music therapy has on the overall social learning in children with ASD remains to be established in the further study.

7.2.1.2 Attunement as motivational factors for joint attention and spontaneous engagement

'Attunement' has been the underpinning theory and principle of this study as already explained extensively throughout the thesis, especially in chapters 2 and 3, indicating that a therapist's sensitivity and responsiveness to the attention of the child is connected to gains in joint attention skills, communication abilities and language development. Therefore, therapists were instructed to do their best to engage each child in each session at the child's level (within the child's focus of attention, range of interest and levels of tolerance) in both conditions (improvisational music therapy and free play). A sensitive, attentive, responsive and finely tuned attitude by the therapist towards the

child's expression and intention was employed throughout sessions in both conditions. Consequently, both the researcher and mothers recognized that in most cases the "musical medium" worked far better in terms of 'tuning in' and 'joining in' with the child's focus of attention, expression and activities of his interest than the use of "toy materials". Many clinicians and theorists claim that improvisational music therapy offers a medium where the child's motivation for self-expression, communication and social interaction can develop spontaneously through the clinically controlled use of improvisation building a sense of self in relationship (Alvin and Warwick, 1991; Robarts, 1996; Trevarthen, 2001; Wigram, 2002; Wigram and Elefant, 2006).

There were many instances described in the clinical vignettes included in the case studies in Chapter 6, where the music therapists were able to engage the child from the very first session (cases of A, B, D, G, K), and in other cases over the course of the sessions (E, F, H, I) through 'musical attunement', whereas almost all of the children found it very hard to share toys with their therapist and became quite territorial in the free play sessions, regardless of who the therapist was and the degree of the therapist's sensitivity in attunement. The characteristics of such behaviours in children were consistent when working in the free play condition whether the therapist recruited as a research therapist for these trials was qualified as a play therapist, music therapist, or music therapy graduate student. The same applied to the music therapy condition; most children responded quite well to 'musical attunement' employed by music therapists, whether the therapist was the researcher, or another music therapist.

What makes 'musical attunement' more effective than mere 'attunement' in engaging the child in mutual play? The author tried to answer this question in chapter 3.5.6 and will elaborate here again: First, the children with ASD are found to possess either intact or somewhat superior musical perception to their normal control group of children (as reported in Chapter 2.4.1). Second, creating music in relation to the child's self expression, interest and focus of attention may evoke natural responses from the child to the therapist who creates the relational music, drawing the child's attention to on going 'essentially relational music making process'. Third, music is essentially 'emotional' and joint improvisation is often an emotionally engaging process. Therefore the mutual music making process in music therapy has analogous features to 'affect attunement' where the core components were identified as largely musical (intensity, timing and shape). Fourth, music can be a less intrusive medium, allowing the child his/her own space and objects, at the same time engaging the child from the distance with different objects of the therapist's choice.

In most dependent variables concerning joint attention behaviours, both group and individual results were much more in favour of improvisational music therapy than free play sessions. The following are examples of joint attention related behaviours in both conditions.

7.2.1.2.1 Musical Synchronicity

The target behaviour of musical synchronicity was originally designed to measure the characteristic events in a musical engagement between the child and the therapist in improvisational music therapy, not the events in free play session. It is, therefore, inherently biased as a measure favouring the music therapy condition.

In Chapter 3.5, the author stated the overall hypothesis; ‘finely tuned, sensitive, responsive and attentive use of music (musical attunement) towards the developmental needs and state of the child with ASD’ will ‘open and maintain the communicative channel’ with the child. The child’s ability in joint attention will increase positively over time and musical attunement will play a role in improving joint attention behaviour of the child with ASD. Joint attention behaviour may be better in the music therapy condition than in the free play condition.

The measurement of musical synchronicity partially answers the main research question two. What is the main musical feature for engaging the child in mutual play (q.2.1)? Does musical attunement appear to play a significant role in engaging the child in mutual play (q.2.2)?

To evaluate the research questions and hypothesis concerning musical attunement, the author examined events of ‘musical synchronicity’ since musical synchronicity is initially created and maintained by the therapist using ‘musical attunement’. Musical synchronicity refers to events where the child and the therapist share some elements of musical expression (rhythm, melody, dynamic, vocalization, gesture) while being engaged in a mutual music making process.

Main findings

The results of the data indicated that there was a significant portion of musical synchronicity events in the music therapy condition in most cases in this study. This answered the question 2.1 and 2.2, indicating that the musical attunement of the therapist plays a significant role in engaging the child in on-going musical activities and seems to facilitate the child into mutual play.

There were marked instances of musical synchronicity both in frequency and duration measures in each four-minute session analysis throughout the sessions and

across cases in music therapy. The results of a repeated measures ANOVA revealed a highly significant effect, comparing the music therapy and free play condition in frequency and duration measures ($p < .0001$). In duration measure, the results approached significance in different session part (unstructured and structured, $p = .0973$), and session order (1st, 4th, 8th, 12th, $p = .0661$). If the samples were larger, differences in ‘session part’ and ‘session order’ may have reached significance.

Music therapy and free play are incomparable, since they are employing two different mediums, improvising music and playing with toys. Therefore, ‘musical synchronicity’ in the free play condition was not expected to be more than minimal. However, as described in the clinical vignettes in Chapter 6, there were occasions where musical synchronicity between the child and the therapist happened in the free play condition (cases of B, E, J). These moments were when the child became spontaneously involved in vocalization and body (or part of the body) movement with the therapist, to which the therapist responded via sensitive attunement using instinctively predominant musical media. On such occasions, complex behavioural features involving eye contact, joy and emotional synchronicity occurred as well.

Clinical features and relationship with previous findings

There are number of musical and therapeutic features that were not measured statistically. Compared to cross modality of Stern (1985)’s ‘affect attunement’, musical attunement’ consisted of both single and cross modality. When musical attunement was largely cross modal, cross modality was not entirely within Stern’s original description of cross modality involving different channel of expressions (e.g., vocal expression is met by facial expression), but in terms of Trolldalen’s description where the therapist employs different modality from the client’s original performance (Trolldalen 2005). When the child was aloof and restless and had no interest in instruments, the therapist often played matching music to the child’s movement and gestures, which was similar to Stern’s description of cross modality in ‘affect attunement’. However, the most common scene in music therapy was when the child played a certain instrument (e.g., the drum and cymbal), and then the therapist accompanied the child’s playing via piano (and often singing). The child’s musical expression was not met by imitation, but by matching technique, where the temporal beat, duration, intensity and rhythm were shared and reflected. The therapist’s matching may display different timbre and rhythmic figures, and often add melodic phrases and harmonization of the original performance of the child, reflecting a certain emotional expression of the child and that of interpersonal events. Therefore, this could also be defined as “musical cross

modality”.

As explained extensively in Chapter 3.5.6, cross modality was not an exclusive quality in music therapy. In K’s case in particular, the mutual music making process was developed from cross modality to single modality progressively in time. In most cases, sessions consisted of a mixture of uni modal and cross modal interaction between the child and the therapist. The children who were fully engaged musically, also developed ‘cross-modal way of initiating interaction’, which will be described in 7.2.1.6.4.

Even though therapists’ methods were not analyzed in the study (this was not intended as a part of the study, except to the extent that a protocol based approach with some specifically defined and structured activities), the author observed that most methods used in musical synchronicity were predominantly empathic in nature such as ‘matching’ ‘mirroring³’ ‘imitating⁴’ ‘grounding⁵’ and at a more advance level, ‘frameworking⁶’ and sometimes ‘controlled use of transition⁷’ (Wigram, 2004; Wigram & Elefant, 2006). Methods such as these also appear in the study by Holck (2002a, 2002b) and are called ‘response evoking techniques’. Wigram et al (2002) state that such ‘therapeutic improvisation’ facilitates a client or group of clients to change and develop their musical expression.

Many music therapists have documented how they engaged with individuals with ASD in the mutual music making process through ‘tuning into’ both musical and non-musical expression of the individual (Alvin & Warwick, 1991; Holck, 2004a; Howat, 1995; Nordoff-Robbins, 1971a, 1977; Robarts, 1996; Saperston, 1973; Wigram, 2002; Wigram & Elefant, 2006). Wigram & Elefant (2006) in their most recent paper, described musical techniques and therapeutic methods that can be used for people with ASD that can help them develop ‘communicative musicality’. Wigram and Elefant also pointed out ‘controlled use of musical attunement to the client’s expressed intentions and feelings’ as the crucial musical and therapeutic method.

Even when the therapist provides ‘frame-working’ and ‘transitions’, the therapist uses musical structure and expression that is to certain degree congruent with the expressions of a client in order to help a client relate. That is to say (as the author

³ “Doing exactly what the client is doing musically, expressively and through body language at the same time as the client is doing it. The client will then see his or her own behaviour in the therapist’s behaviour” (Wigram, 2004).

⁴ “Echoing or reproducing a client’s response after the response has been completed” (Bruscia, 1987, cited in Wigram, 2004)

⁵ “Creating a stable, containing music that can act as an ‘anchor’ to the client’s music” (Wigram, 2004).

⁶ “Providing a clear musical framework for the improvised material of a client, or group of clients, in order to create or develop a specific type of musical structure” (Wigram, 2004)

⁷ “The process by which the music of the therapist and the client(s) moves from one musical framework to a new musical framework” (Wigram, 2001, 2004).

already stated in Chapter 3.5.6), ‘matching’ played a key role from which certain therapeutic methods emerged. The ‘matching’ technique may also allow the therapist to tune into the child’s expression as well as to challenge the child simultaneously. For example, the therapist can play the same temporal beat, duration and intensity with the child while differing rhythmic figure, which can be quite challenging for the child who has little tolerance over any type of changes.

There are many music therapists who emphasize the importance of offering predictability in the musical structure, which clients with ASD can relate to, but also offering a ‘creative and flexible structure that is attractive (Wigram & Elefant, 2006)’ for them (Brown, 1994; Robarts, 1996; Wigram, 2002; Wigram and Gold, 2006; Wigram & Elefant, 2006).

The author has observed and documented such moments in the clinical vignettes in the case studies in Chapter 6, and most children (A, B, D, E, G, H, K) responded very positively towards the empathic way the therapist used music (musical attunement), to the extent that those children began to spontaneously initiate musical engagement (Initiation of Engagement by child) increasingly over the course of the sessions. During a musical synchronicity event, there was also spontaneous eye contact, joy and emotional synchronicity observed. These behaviours were occasionally observed in other musical engagement such as turn-taking activities, or non-musical interactions in free play as well, but predominantly in musical synchronicity events. Sometimes, when the child and the therapist were fully engaged in the musical synchronicity event, spontaneous and complex interaction patterns developed involving eye contact, joy and emotional synchronicity all at once. When the musical interaction involving musical synchronicity events developed very well between the child and the therapist, the child began to initiate gestural interaction with the therapist, which was described in detail in Chapter 6 (6.1.6.1). This will be elaborated further in 7.2.1.5, common features in clinical vignettes.

7.2.1.2.2 Joy and Emotional Synchronicity (ES)

Joy refers to events where the child either smiles, or laughs during the interaction with the therapist, whereas emotional synchronicity (ES) refers to the moment where the child and the therapist share emotions. In this study, only happy and sad emotions were measured for ES, as it was decided that these two expressions were likely to be the most clear and unambiguous when it came to coding and scoring frequency and duration. However, most ES events were happy moments except the case of C in one particular

session where C cried. The events of ES were measured when there was event of Joy. Therefore, Joy and ES are intrinsically linked together.

Strictly, Joy and emotional synchronicity are not ‘joint attention behaviours’, however, ‘expression of emotion’ and ‘affective sharing’ with another person during social interaction play an important role in the early human development, and also throughout the life span of humans. Autistic children were often reported to have difficulty in expressing their emotions at the right place and time, and in sharing their emotions with others. Therefore, the clinical implication of the occurrence of joy and ES during the joint engagement with the therapist is significant as the motivational factor for the child to join in shared activities with the therapist.

Results

The results answered the following three questions;

- *Was music therapy significantly better than free play at improving joint attention behaviours (in this case, Joy and ES during the joint musical engagement) ?*
- *Were there observable and measurable changes in one session, especially when comparing the unstructured and structured part?*
- *Were there changes in response over time from the early to late period of music therapy?*

The results of Joy and ES were quite similar as both measurements were intrinsically connected; ES was mostly measured when there was a Joy event.

A repeated measures ANOVA in both frequency and duration measures in Joy and ES revealed a highly significant effect comparing the music therapy with the free play ($p < .0001 \sim p = .0001$), session – 1st, 4th, 8th, 12th ($p < .0001 \sim p = .0055$) and session part – unstructured and structured ($p = .0006 \sim p = .0088$).

Statistical analysis revealed that there were more examples of Joy and ES both in frequency and duration during music therapy than in free play. There were more recorded events of Joy and ES observed in the unstructured part where the therapist allowed the child to lead the interaction, and less events of joy and ES in the structured part. This will be explored further in the discussion on Initiation of Engagement reported later. While the events of Joy and ES (frequency and duration) consistently increased over the four selected sessions (1st, 4th, 8th, and 12th) in the music therapy condition, the same measures showed inconsistent development over time in the free play condition.

Relationship with previous findings

Studies indicated that autistic children do not readily appear to share positive

affects (smiles and laughter) with others during interactive situations as much as their mental age matched non-autistic children, but rather display high frequencies of unshared laughter in strange or inexplicable situation (Joseph & Tager-Flusberg, 1997; Kasari et al, 1990; Reddy, Williams & Vaughan, 2002). Therefore, one could say that implication of this finding for the development of children with ASD is important. The role of finely tuned affective sharing (interaffectivity) during the early dyadic (person-person) and triadic (person-object-person) interaction between infants and mothers was well-documented in detail in infant studies (Bakeman & Adamson, 1984; Brazelton, Koslowski, & Main, 1974; Stern, 1974; Trevarthen, 1979), and referenced in Chapter 2.2.2 ~2.2.4. The caregiver scaffolding role, where the caregivers' sensitivity and capacity to support joint attention episode in interacting with infants, were also emphasized (Adamson & Bakeman, 1985). Stern (1985) considered the mother's 'affect attunement' to her baby's expression enables and maintains 'interaffectivity', which was crucial feature of intersubjectivity in infancy. The role of the therapist's attunement was also turned out to be crucial in reaching and maintaining 'emotional synchronicity' between the therapist and the child.

Data presented in graphs (figure 5.13~5.16) indicated that the social timing mechanism in the children, especially in regard to expressing and sharing positive affects, improved consistently over sessions and clearly more so in music therapy condition. This signifies the role of musical attunement in the development of 'interaffectivity' in children with ASD. The temporal structure of music and the specific use of controlled musical attunement in improvisational music therapy indicate that we can help children to experience and develop affective skills in a social context.

The mother of B made a comment that her child looked almost normal in music therapy. It seems that music therapy provides such a premise where finely tuned affective sharing between the child and the therapist became possible and children could function more like normally developing peers of their age at times. This again remains to be investigated further.

There is no controlled study known to the author, which investigated the expression of joy and ES with children with ASD in improvisational music therapy to date. Nevertheless, improvisational music therapy literature is full of description of such behaviour in clinical reports and case studies. In a qualitative research study involving the microanalysis of the music therapy process, Holck (2002a) showed the chain of musical interaction between the child and the therapist through detailed transcriptions of facial expressions showing joy (smiling spirals), eye contact, the initiatives of the child with well-timed responses of the therapist to the child's musical expression.

Wigram (2002) recorded occurrences of ‘joy’ and ‘empathic synchronicity with shared emotion’ with Joel (autistic boy) in various sections of a diagnostic music therapy assessment session. Saperston (1973) also recorded occurrence of ‘joy’ and ‘emotional sharing’ by the child, he described as “R”. Improvisational music therapy literature has many case studies showing musical-emotional improvisational interaction between the child and the therapist (Alvin & Warwick, 1991; Brown, 1994; Holck, 2002a; Howat, 1995; Nordoff and Robbins, 1971a, 1977; Wigram, 2002) and music therapists have been claiming the ‘essential emotive power of music’ as an excellent therapeutic medium for children with severe communication difficulties. The findings from this study perhaps provide some initial quantitative and qualitative evidence suggesting improvisational music therapy does promote positive emotions, expressions and emotional synchronicity in children with ASD. The results suggest that children were far happier and more able to share their emotions with the therapist in music therapy than in the free play. In addition, children appeared to be happier and more able to share their emotions with the therapist in the unstructured part rather than in the structured part of the session.

7.2.1.2.3 Initiation of Engagement by the Child

Initiation of Engagement refers to the events where the child spontaneously demands, or initiates interaction with the therapist. IE also refers to a behaviour where the child shows initiation of some change, or changes in the way both the therapist and the child are playing, and indicates in some way that the child expects the therapist to follow him/her.

True IE is a rare behaviour (often ambivalent as well, see Holck, 2002a, 2004a) found in children with autism, even when the child is high functioning and verbal. Frith (1989) wrote a descriptive account where she tried to make a conversation with a 17 year-old girl with autism (p118-119), however unsuccessfully. H - a lively and talkative 4 year 5 month old boy – always approached the researcher and the research assistant each time he came to the clinic. He always held the same toy cars and asked same questions repetitively - “this is red and this is blue, what is this?”. His repetition compulsion was so great that his mother often stopped him by saying, “stop there! I’ve had enough of that!”. It is often a feature of the pathology that children with autism do not appear to use language in an appropriate communicative way, but in this rather ritualized way. Therefore, measuring true IE, verbal or non-verbal, holds both important developmental and clinical relevance in the field.

Results

The figure 5.18 in Chapter 5 presented the result of statistical analysis in a boxplot. This answers the following three analysis questions:

- *Was music therapy significantly better than free play at improving joint attention behaviours?*
- *Were there observable and measurable changes in one session, especially when comparing the unstructured and structured part?*
- *Were there changes in response over time from the early to late period of music therapy?*

A repeated measures ANOVAs revealed a highly significant effect comparing music therapy and free play conditions ($p < .0001$), a significant effect comparing sessions, 1st, 4th, 8th, 12th ($p = .001$) and session part, unstructured and structured ($p = .0292$).

The results indicated that children showed more initiation of engagement with the therapist in music therapy than in free play. There was a consistent increase in events of IE in music therapy over the course of sessions, while there were inconsistent patterns in free play. Finally, there were more IE events of behaviour in the unstructured part of the sessions than the structured part.

Relationship with previous findings

The results were consistent with Joy and ES results, which seemed to indicate that there are close links between ‘musical attunement’, ‘Musical Synchronicity (MS)’, ‘Joy’, ‘ES’ and ‘IE’. First, musical synchronicity was created and maintained initially by the therapist’s use of ‘controlled musical attunement. Second, the children appeared to be happier (more joy displayed) and ES occurred spontaneously within MS events. When children were happier and their emotions were met and shared by another person, they were more able to initiate engagement. The work of infant and autism researchers indicated that a consideration of the motivational process may be crucial in understanding the role of joint attention in social development (Adamson & McArthur, 1995; Kasari et al; 1990; Mundy & Acra, 2006; Trevarthen, 2001; Trevarthen & Aitken, 2001). Certainly, the result of this study for the Initiation of Engagement suggests that music is not only ‘response evoking’, but also a ‘motivating’ medium for social interaction, especially when used therapeutically in a well-measured way.

The last, but not least point in this finding is that children showed more IE in the unstructured part of the session than the structured part. As improvisational music therapy has been long criticized for a lack of structure, despite the fact that music itself contains a great deal of structure,, the result of this study provides a different way of viewing the usefulness of less directed approaches when compared with highly

structured models such as TEACCH and LOVAAS.

The researcher now poses a question; what is the optimum condition to engage the children and motivate them to social interaction? The results of this study seemed to be consistent with some of the recent studies (Escalona et al, 2002; Lewy & Dawson, 1992; Siller & Sigman, 2002; Watson, 1998). In a longitudinal study, Siller & Sigman (2002) indicated that the caregiver's higher level of synchronization with the child's behaviour during the play interaction was related to higher gains in joint attention skills and language improvement. Other studies (Lewy & Dawson, 1992; Watson; 1998) indicated that when the adult's behaviour was contingent to the behaviour of the child, communication and social interaction increased in children with ASD. One experimental study suggested that the adult's imitative behaviour of the child's behaviour was effective in promoting a proximal social behaviour such as touching, while contingent behaviour of an adult was effective in promoting a distal social behaviour such as attention (Escalona et al, 2002). Siller and Sigman (2002) pointed out the close relationship of a sensitive and attentive approach of the adult to the concept of "child choice" that allows the child a choice and sharing of control over materials and tasks indicated to promote the language development in children with language delay. The design of this study including unstructured and structured parts of the sessions could be understood as the concept of "child choice" and allowing and sharing of control over what and how the therapist and the child do and interact together. In fact, giving the child a choice of what and how to do things has been around in improvisational music therapy as long as one can remember. Autism researchers can then recognize some of the relevance of what music therapists have been working on and developing since the 1960's.

Since this study was based on very a small sample, it would be presumptuous to draw any firm conclusion that would generalize. However, the results of IE suggest that musical attunement does have a crucial role in encouraging the child not only to be engaged, but also to be able to initiate interaction with the therapist in music therapy. Maybe, in the early phase of therapy sessions, and also in the earlier (unstructured) part of the session, it is important to allow the child to be in control of what is happening between the child and the therapist (adult). To test this clinical implication, one could plan a future study where the order of structured and unstructured part of sessions are randomly assigned to see whether the children who had a structured part of session first and then an unstructured part responded differently from children with the current order of sessions.

Although the overall results from the structured part was less than the

unstructured part, the difference between two different session parts was not so large, and there was also a consistent increase of IE in the structured part. This seems to suggest that it is also important to include some adult-led structure, even though this might provoke disruptive behaviour, and a possible defensive reaction from the child. The author described the course of each child in both music therapy and free play sessions where almost every children showed difficulties in dealing with situations where the therapist begin to lead the interaction between them ('commonly observed defensive behaviours'). It was the author's impression that the children were more able to comply with the therapist's interpersonal demands when they like and know the therapy and the therapist well enough. This meant that they became more cooperative towards the therapist's interpersonal demands in music therapy over time and this will be fully discussed in 7.2.1.3. Within their level of tolerance, introducing new structure and activity was also developmentally necessary and therapeutically important as Brown (1994) and Wigram (2002) pointed out.

No controlled study on effect of music therapy on the child's capacity in initiation of engagement in autism emerged in the review of the literature. Only Bunt (1994) reported in a general way increased initiatives in children with special needs in music therapy.

Through detailed transcription, Holck (2002a) was able to show musical interaction processes between the child and the therapist where there were initiatives of the child among other significant behavioural features such as eye contact, joy and ES. However, there are case studies describing moments where the child begin to initiate something with the therapist musically (Brown; 1994; Robarts, 1993, 1996; Saperston, 1973; Wigram, 2002) in improvisational music therapy.

The finding of IE from this study perhaps provides some initial quantitative and qualitative evidence suggesting improvisational music therapy does promote initiatives in children with ASD together with other important aspects of interaction such as positive emotions, expressions and emotional synchronicity.

7.2.1.3 Children's responsiveness towards interpersonal demands

Children's responsiveness towards interpersonal demands made by the therapist does involve coordinated attention and measures children's responses to social invitation by the therapist. Responses to Initiation of Interaction by the therapist were recorded in this study since this type of behaviour indicates the level of cooperation by the child during the interaction with the therapist.

Three types of Responses to Initiation of Interaction were measured;

- a) Compliant Response (CR) ;
- b) Non Compliant Response (NC) ;
- c) No response (NR).

These three sub-items consist of total Response to Initiation of Interaction. The frequencies of the therapist's Initiation of Interactions (II) are connected to the total number of Responses to Initiation of Interaction (RII) of the child. If the therapist made seven initiations of interaction, there were seven corresponding response to requests. In Chapter 4, the questions for analysis (4.9.3 – No 17, 18, 19) were set out to report what percentage of each respective response was occurring depending on the condition and session.

7.2.1.3.1 Response to Initiation of Inteaction (RII)

7.2.1.3.1.1 Main findings

In this section, three sub-types of RII are explained and separate results of statistical analysis are presented.

a) Compliant response

Compliant Response (CR) refers the child's complying behaviour to the therapist's suggestion, direction, demands, while playing together.

Results: A repeated measures ANOVA (table 5.41) revealed a highly significant effect comparing music therapy with free play ($p < .0001$) and a significant effect comparing session order, 1st, 4th, 8th, 12th ($p = .0444$). There were more compliant behaviours in music therapy than in free play. While the median value increased consistently over selected sessions in music therapy, the median value of selected sessions were inconsistent in free play.

While there was dramatic increase of box size to the full 100 % at the 4th session, the median value and the range of overall values of the 8th, and 12th session showed only a slight increase in music therapy. One might speculate that the results suggest that music therapy can achieve good progress within a short term (up to 4th sessions) concerning CR, and then goes into a steady, but slow phase of improvement. In free play, CR increased steadily over the selected sessions. The interesting fact was that the value of the box size of the 12th session in free play reached almost to the level of the 1st session in music therapy.

b) Non-compliant response

A Non-Compliant response (NC) refers to the child's responses in a non-

compliant way to the therapist's suggestion, demand, or direction either by turning his back on the therapist, or walking away (passive avoidance), or deliberately rejecting the therapist's demand by doing something opposite, or unrelated (active rejection).

Results: A repeated measures ANOVA revealed a significant effect comparing sessions - 1st, 4th, 8th and 12th ($p=.0137$). Comparison between music therapy and free play condition also approached significance ($p=.0516$). If the sample were larger, differences between 'conditions' may have reached significance. While the overall box sizes and the range of whiskers showed inconsistency over selected sessions, the median value of each box over selected sessions revealed a more or less consistent pattern of decreasing NC responses.

c) No response

No Response (NR) refers to the child's behaviour showing no sign of response that the child simply continues to do what he has been doing. The child may not show an awareness of the therapist' intention or demand.

Results: The results of a repeated measures ANOVA indicated a significant effect ($p=.0006$) when comparing music therapy and free play condition. Figure 5.24 showed that children displayed 'no response' behaviour two times more in free play than in music therapy.

7.2.1.3.1.2 Relationship with previous findings

A recent study (Jackson et al, 2003) dealing with responses to social bids compared children with autism with verbal age-matched children with mental retardation in naturalistic settings. Autistic children produced fewer positive responses and more 'no responses' than children with mental retardation. There are parent-child interaction studies both in autism (Arbelle, Sigman & Kasari, 1994) and with handicapped pre-schoolers (Lemanek, Stone & Fishel, 1993) showing that children appeared to display less compliant behaviour when faced with interpersonal demands such as gaze avoidance and negative affect patterns. These findings were consistent with the findings of almost every one of the individual case studies in this study. Although there were many different ways and degrees, children displayed numerous commonly observed defensive behaviours across the sessions and cases when face with interpersonal demands. Therefore, it was surprising to find out that despite the difficulties the children demonstrated, they still made much improvement in compliant responses (positive responses) in both conditions. This suggests that even though almost every child displayed their own level of difficulties and defensive behaviours towards

interpersonal demands made by the therapist, they were responding positively over 12 sessions to a progressively greater degree, and the improvement on positive responses was greater in improvisational music therapy.

Braithwaite and Sigafoos (1998) did a comparison study on the effects of social versus musical antecedents on communicative responsiveness in five children with developmental disabilities and severe communication difficulty. In the social condition, the children were offered opportunities to greet, name objects, and request materials. In the music condition, the same opportunities were embedded within music/singing activities. They found that three out of their five children responded with higher percentages of appropriate communication responses while two children responded similarly to both conditions. The results suggested that a communication opportunity with a musical activity may lead to increased positive communicative responses for some children with developmental delay and severe communication impairment.

Compared to the results of Braithwaite and Sigafoos, the results from this current study are much more favourable to music therapy, probably due to different approaches in music therapy, different subjects, and different measurements used to evaluate the results. This may suggest that improvisational music therapy is more effective in facilitating positive responses from the children with severe communicative difficulties, including autism than other approaches in music therapy, where those other approaches contain a high degree of imposed structure as is suggested in the Braithwaite and Sigafoos study.

Strictly, responses to the social invitation category have certain similarities with the behavioural requests (proto-imperative) category in the ESCS. The ESCS also measures 'response' and 'no response' in the Behavioural Request category. However, researchers did not report the results of Response to Behavioural Request (RBR) in autism studies. Siller (2005, personal correspondence) explained that the researchers at the University of California, Los Angeles stopped measuring RBR since RBR may represent some degree of compliancy in the child, but does not necessarily measure social understanding. During the ESCS test, the tester allows the child to play with toys for a while and then make a request to the child by saying, "give it to me" verbally, then later with gesture. Measuring RBR in the ESCS and RII (CR, NC, and NR) in this study has a similar quality, yet at the same time there are differences. It starts from a completely different concept.

While the tester in the ESCS is instructed to use a clear 'command' tone of voice in a more directive manner when making these requests (rather than a polite or

playful tone) since it is important to convey the imperative function of the RBR test, the therapist in this study was instructed to be sensitive and attentive towards the child's focus of attention, the range of interest and level of tolerance. Therefore, each time the therapist made a demand to the child such as "shall we play this in turn-taking?", "how about this?", even the interpersonal demands were made on the basis of the child's state and level of tolerance. Therefore, the author considers that responsiveness of children was inherently embedded with their level of perception regarding the social intention of the therapist. Tomasello and his colleagues (2005) also pointed out that autistic children understand the intentions of others. It could also be interpreted that while responses to Behavioural Request in the ESCS test show compliancy of the child, responses to Initiation of Interaction show the children's own perception and decision on whether to respond to the social invitation of the therapist.

The purpose of the tester in the ESCS for RBR measure was to obtain the toy from the child, while the purpose of the therapist in this study was to engage the child for either on-going interaction, or new interaction. Therefore, the interpretation of the results of RII (CR, NC, NR) should be treated differently from the ESCS. Thus, children's responsiveness, especially in the recorded increases in CR and decreases in NC suggest the children's increased willingness to participate in the interaction with the therapist over the selected sessions in both conditions, and this was more so in music therapy.

The fact that children displayed approximately half as many 'no response' behaviours in music therapy than in free play seemed to correspond to some of the claims of music therapists. Holck (2002b) stated that music therapists use 'response evoking techniques' in music therapy. Since the characteristics of improvisational music therapy have been described in a previous section (7.2.1.2) in detail, they will not be repeated again.

The overall results of the children's responsiveness towards interpersonal demands made by the therapists suggest that the effects of improvisational music therapy were markedly better than that of free play. Children showed more compliant responses, less non-compliant responses and less no responses in music therapy than in free play. This may be due to 'musical attunement' used throughout music therapy sessions, and suggests that 'musical attunement' was better than 'attunement' alone in terms of enhancing cooperative responsiveness and reducing negative responsiveness in children.

The author described the degree of attachment children displayed towards the

therapists in both conditions. The Sigman and Ungerer (1984) study ('the stranger reaction study') also revealed that children with autism, between two and five years old, displayed attachment behaviour towards their mothers when compared with non-autistic retarded children of the same mental age. Many children had shown some degree of attachment towards the therapist in free play, however, none of the children addressed the therapist as "mummy" in free play, while some children called the music therapist "mummy" in the music therapy sessions. Perhaps, one could say the degree of attachment differed as well towards music therapists, and the therapists in free play. This will be elaborated more in 7.2.1.6. This may be the clinical evidence that sensitive and responsive and finely tuned use of music ("controlled musical attunement"; Wigram & Elefant, 2006) enhances 'musical-emotional communication' together with 'joy' and 'emotional synchronicity', which results in children's spontaneous willingness to respond, initiate and engage further. In simple terms, the author observed that when children knew what to expect from the therapist well enough and liked the therapist very much, they were more willing to try out new things with the therapist. The results suggest that a trusting therapeutic relationship modifies responsiveness of children with ASD.

7.2.1.4 Social Interaction

Turn taking refers to a playing pattern where a sequence of turns to play alternating between the child and the therapist occurs. In this study, 'turn-taking' was chosen as one of the target behaviours as an example of social interaction since turn-taking is the most common form of social interaction with a clear structure that can be observed equally in both music therapy and free play condition.

Main findings

The results of a repeated measures ANOVA revealed a highly significant effect ($p < .0001$) comparing turn taking in music therapy and free play in both frequency and duration measurements. This means that children showed more turn-taking behaviours for longer duration in music therapy than in free play. In duration measures, table 5.38 reported a significant effect ($p = .0370$) comparing the unstructured part and the structured part in both music therapy and free play. Children showed longer periods of turn-taking behaviours in the structured part than in the unstructured part. Selected session order (1st, 4th, 8th and 12th) also appeared to have nearly significant value ($p = .0512$). This may reach significance, given a larger sample indicating there might be a consistent pattern of development over time.

Relationship with previous findings

Holck (2004b) devoted a whole article to ‘turn-taking in music therapy with children with communication disorders’, including children with autism. She emphasized the importance of facilitating ‘the child’s desire and ability to participate’ in social interaction since the children have great difficulties in participating in turn-interplay; “*they take far fewer initiatives and have a longer reaction time, which gives a greater number of break downs in interplay*”(Holck, 2004b). She considers ‘turn-taking’ plays a central role in the social and language development of the child. ‘Turn-taking’ is often compared with conversation, or dialogue. Wigram (2004) stated that music offers ‘a marvelous medium for engaging in different types of conversation or dialogue between two or more people’. Wigram (2004) defined two different types of dialogue; ‘turn-taking dialogues’ and ‘continuous free-floating dialogue’. As stated before, in this study, ‘turn-taking’ was chosen as one of target behaviours.

Holck (2002b) pointed out that musical turn taking usually consists of imitation and variation. Initially it is the therapist, who imitates what the child does in order to build empathic mutuality of interaction between them. In this study, the author observed that turn taking could occur with, and without active participation, or intention of the child. For example, non-verbal and low functioning autistic children did not readily take part in turn-taking activities in either condition. However, as the sessions went on, children often vocalized (see case of D’s typical vocalization “oi”) with a short pause before the next short vocalization. What most therapists did in both conditions was that they imitated what children vocalized. With a well-timed interjection⁸ of the turn, the therapist can ensure a short turn taking with children (mainly two to three turns). At the initial stage, children did not seem to be fully aware of the occurrence of turn taking especially when the therapist only used vocalization in both conditions. However, when the therapist used both vocalization and other instruments such as the piano accompaniment with singing, they often immediately recognized the therapist’s imitation of their vocalization evidenced by their looking at the therapist. When their voice was imitated in the therapist’s playing and singing, some children actively changed the way they vocalized. For example, in D’s case from simple “oi” sounds to short melodic-rhythmic phrase of “Eh-Yah-Oo”. D often led the vocal turn-taking activity by initiating a different sound with varied musical elements. Sometimes, if the therapist initiates a different way of playing, children also imitated even though

⁸ “Waiting for a space in the client’s music and filling in the gap”, Bruscia, 1987, p. 535, cited in Wigram, 2004.

children's imitation was to a relatively far less degree and inconsistent than the therapist's imitation of them. Meltzoff & Gopnik (1993) claimed that while even very young infants can recognize and perceive imitation as 'something like me' experience, autistic children might find such imitative interaction less predictable and enjoyable than normally developing children. Studies assessing autistic children's capacity for imitation (DeMyer et al, 1972; Sigman & Ungerer, 1984) found that autistic children performed poorly on imitation tasks than their mental-age-matched control groups. The finding of Nadel et al (1999) study was also consistent with the current study. They found that autistic children did not alternate the roles of initiation and imitation in turn taking readily. Holck (2004b) noted that this ability does not appear fully developed until the age of two and a half years in normal development.

Holck (2004b) also cited a study (Mirenda et al, 1983) done on older verbal autistic children pointing out that older children looked at their partner longer when talking to themselves, rather than when they are in dialogue with their partner. This pattern was also observed among high functioning, verbal children (H, J) during the free play sessions in this study. However, they made clear eye contact with the therapist during the mutual music making processes, especially when the musical interaction was initiated by themselves. For initiating, maintaining and developing a turn-taking dialogue, there are a number of non-verbal cues (eye contact, head nodding, facial expression and prosody; Holck, 2004b). During well-developing musical turn-taking activities between the child and the therapist in music therapy (H's case when he initiated volume minus and volume plus playing), there is spontaneous eye contact, a lot of lively facial expression (smiling and laughing), spontaneous use of prosody with excited voices and melodic, dynamic intonations at the right moment of time. Roberts (1996, p.140) also stated; *"it is this very intersynchrony, flexibility and creative reciprocity that is absent in the autistic child, and which the music therapist seeks to help the child experience and assimilate to whatever extent she or he is able to do so."* Holck (2004b) also described similar pattern developing in music therapy with 'Eigil - a young boy with communication disorder.

This clinical evidence is consistent with what Holck (2002b) talked about in the later stage of turn taking between the child and the therapist in music therapy that they 'exchange roles', and that the initiator becomes the imitator.

Both Holck (2002b) and Wigram (2004) considered the necessity of indicating or explaining the structure of turn taking to the child by using either gestural cues, or verbal cue, "now it's your turn, it's my turn". However, in this study, the author observed that the children did not readily respond to verbal prompting for turn-taking

activities. In fact, the children did not respond well to any verbal prompting, requesting interpersonal demands. This was consistent with brain research findings of abnormal social auditory processing in children with autism (Boddaert et al, 2003; Boddaert et al, 2004; Gervais et al, 2004). These studies clearly indicated that individuals with autism failed to activate the relevant brain region (superior temporal sulcus (STS); voice-selective regions) in response to vocal, or speech like sound. The findings indicate not only abnormal cortical processing of socially relevant auditory information in autism, but also the persistence of it into the adulthood.

There could be number of speculations one can make when one tries to explain why children did not respond readily to social demands from others. What was clear in this study was that when children were aware of the therapist's intention of trying to get them to do certain things, they often delayed their responses, did not leave any gaps for the therapist to play, or abruptly ended the play by moving away.

There were also episodes of what Holck (2004b) called 'turn-overlapping' between the child and the therapist. She cited Plahl (2000)'s case of a boy with autism where the incidents of turn overlapping (where the boy started his turn before the therapist finished her turn) were significantly decreased during the music therapy. The individual case study findings of this study are not entirely congruent with Plahl's finding. Some children (A, J) continued showing difficulties in turn yielding especially when they became more accustomed to music therapy. For example, J would say "yes" to verbal turn-request from the therapist, but continue to play without leaving any gap for the therapist, and when the therapist actually stopped him from playing in order to have her own turn, he stopped his participation all together.

The findings of this study are consistent with Bunt (1994)'s Hackney project reporting increased turn-taking activities with increased eye contact.

The findings of this study present a chain of musical interaction pattern where complex non-verbal social cues occurred simultaneously. This establishes that improvisational music therapy offers a premise where rich developmental patterns of mutual interaction involving eye contact, joy, emotional synchronicity and turn taking occur.

7.2.1.5 Fidelity of treatment manual related results

In order to specify the treatment procedures and allow the therapist a systematized direction for proceeding in the sessions with the child, a treatment manual was prepared and used. There were two measurements: Initiation of Interaction by therapists (II) and Turn-taking (TT), which were designed to answer some treatment

manual related questions. As the therapists were instructed to introduce, either modeling, or turn-taking activities during the second half of each session (structured part), the scores of events of Initiation of Interaction by therapist (II) and turn-taking provide some clear evidence of fidelity of the treatment protocol.

Main findings

The results of a repeated measures ANOVA answer the treatment manual related questions;

- *Were the therapists able to follow the direction of the manual? Was it possible to apply the instruction of the manual to autistic children as it was described? Did it work?*

The results (table 5.40) of II revealed a significant effect comparing music therapy with free play condition ($p = .0026$), and when comparing the unstructured with the structured part of the session ($p < .0001$). Interaction of condition (music therapy vs. free play) with session part approached significance ($p = .0708$).

There were more II in the structured part in both conditions. Compared to music therapy, the value of II in free play was stretched out further in both the unstructured part and the structured part. This may be due to children's level of engagement commonly shown in both conditions. In the music therapy condition, children were more spontaneously engaged with the therapist through musical activities. In such a situation, the therapist does not need to work as hard on promoting II compared to when children were not engaged to such a degree. In the free play condition, however, children were often engaged in solitary object play, and the therapist had to promote more II in order to join the child during the unstructured first half of the session, and later to introduce modeling, and turn taking during the structured second half of the session.

The results of turn taking were presented in 7.2.1.4. There were more turn-taking events in music therapy than in free play, and they lasted longer. Turn-taking duration was significantly longer in the second half of the session (structured part) than the unstructured (first half of the session in both conditions).

Relationship with previous findings

The use of treatment manual appears to be so rare both in real clinical practice or in research in improvisational music therapy that literature search did not locate any relevant study using a treatment manual. Kasari (2002) examined various early intervention programmes and found almost none of the programmes qualified as well-

established treatments for autism due to the lack of scientific evidence. She pointed out, among other elements, that the use of clearly instructed treatment manual and fidelity check to determine if the treatment is conducted as intended, are vital. Gold, Wigram & Elefant (2006) also emphasized the need for a well-designed study using such methods.

The results of II and TT offer some evidence as to whether the treatment was conducted as intended. Initiation of Interaction by the therapist and turn taking also occurred in the first, unstructured part of the session, but during the second half, structured part, II and TT occurred more since the therapist was instructed to introduce some structure through modeling, or turn-taking. In both conditions, II and TT duration were more observed in the structured part of the session.

Children were more spontaneously engaged with the therapist in music therapy to the extent that Initiation of Interaction by the therapist was comparatively less necessary in the music therapy condition than in the free play condition both in the unstructured and structured part.

It also shows that the music therapy condition was more effective at facilitating a longer duration of turn taking than during free play. In contrast with previous variables such as joy or emotional synchronicity, there were longer durations of turn-taking activity in the second (structured) half of the sessions in both music therapy and the free play condition than in the first (unstructured) half. This may be due to the clinical protocol of the study where the therapists are instructed to introduce either modeling, or turn-taking activities to the children in the second half of the session. The turn taking may occur spontaneously in the first half, but occurred more often in second half when clinical direction was influencing the child that way.

The results suggest that therapists were able to follow the directions of the treatment manual and it was possible to carry out the instructions of the manual as it was described to children in this study.

7.2.1.6 Common features in clinical vignettes

There were some striking clinical phenomena among children in this study most of which were initially described and introduced in the individual case studies in Chapter 6.

7.2.1.6.1 Some of the commonly observed idiosyncrasy in playing

Most children in this study did not have difficulties either in playing instruments or with toys in functional way, meaning using an object in an appropriately functional way. This was consistent with research findings (Libby, Powell & Jordan,

1998; Williams et al, 2001). However, their play was often repetitive and idiosyncratic in some ways. The degree of repetitiveness and idiosyncrasy varied from child to child.

The most commonly observed behaviour was sensorial play (or sensorimotor playing). Many children were engaged in spinning the cymbal at some time during the music therapy sessions. Xylophone dismantling was also often observed during the music therapy sessions. The most commonly observed behaviour in free play was repetition of certain activities. For example, when using the dollhouse, many children used dolls to go up and down the stairs, to go in and out of the doors, or to open and close of the doors. Many children were also fascinated with spinning tops just as they were fascinated by spinning the cymbal in music therapy. There could be number of psychoanalytic and developmental interpretation of these behaviours. Tustin (1990) saw these compulsive dismantling and spinning activities of children with autism as attempts to control some extreme feelings such as anxiety, fear of disintegration or despair, whereas sensorimotor play is viewed as emerging during the first year of infancy when children seem to derive a low level of stimulation from these acts. Although the author does not intend to go deeper to interpretations of these phenomena since each case may differ from the other at different stages and meanings, these behaviours seemed to indicate ‘control issues’, which will lead us to the next topic; commonly observed defensive behaviours.

7.2.1.6.2 Commonly observed defensive behaviour

As explained a number of times, during the unstructured part of the session the therapist allowed the child to lead the interaction between them by sensitively tuning in to the child’s focus of attention and activity. Most children responded positively to the unstructured part (see individual clinical vignettes in music therapy in Chapter 6), and many children displayed such vitality of affects (smile, laughing) together with spontaneous eye contact when the event of musical synchronicity was developing very well. Children were able to lead the interaction on their own terms and within their own capacity, which was often quite powerfully controlling and dominating in nature.

Children, however, soon noticed and reacted quite negatively when the therapist began to introduce some structure in the second half of the sessions. Even though the therapist was suggesting modeling and turn taking within the child’s focus of attention, interest and activity, there was at times an immediate depletion of vitality (a sudden change from a smiling to a sullen face), and a depressive mood and high level of anxiety displayed in their behaviour. The degree of defensiveness in children during the structured part of the session differed depending on each individual’s level of sensitivity

and tolerance.

Some children with low level of tolerance (A, F, K), either threw temper tantrum, cried uncontrollable, or threw either toys, or instruments away at times when therapists intervened in their play via modeling, or turn-taking, however sensitively.

Some extremely sensitive children sensed the therapist's intention to make an interpersonal demand a second or so before the therapist actually begin to structure the session and those children immediately reacted defensively (the case of B, G and H).

The following descriptions are some of the commonly observed reactions when children faced interpersonal demands made by the therapist in both conditions that the author divided into two sub types; 'passive' and 'active' reaction.

Passive reaction:

- Sighing, or turning their back to the therapist when the therapist tried to join the child's activity (C, F);
- Slipping away from the demanding therapist when the therapist was about to make some suggestions, or demand something from the child (B, C, D, G);
- Hiccups and violent coughing in response to the therapist's suggestions (J);
- Complying to the therapist's suggestion to play with something that the child enjoyed very much before, but with far diminished enthusiasm, interest and attention span in music therapy (A, B, D, G, H, J);
- Complying to the therapist's suggestion to try out a new activity, or instrument, but with extreme anxiety, or irritation (E, H).

Active reaction:

- becoming angry and aggressive when the therapist try to invite (or intervene) them to some activity (F, K);
- Cooperating a little, but soon re-directing the therapist's attention (A, B, E, H, J);
- Crying when the therapist claimed her turn during toy play (A);
- Playing well, but hardly ever complying with the therapist's direction (K);
- Compulsive repetitive behaviour shown when the therapist began to make interpersonal demands via modeling, or turn-taking activities (G, H);
- Rejecting the therapy and leaving the room when the therapist intervened constantly during the second half of the sessions (C, F, G, K);
- Rejecting the play material of his own choice when the therapist suggested to share it via turn-taking (A, J);
- Taking all the toy cars for oneself, leaving no cars for the therapist when the therapist

- constantly try to join their activity of rolling a toy car (G, H);
- Taking charge of the situation and playing out the therapist’s role (B).

Each child displayed a different range, or level of certain defensive behaviour at different stages of each therapy phase, and at different conditions, probably due to their own developmental level and individual temperament. Most therapists, including the researcher, felt that most children were able to explore both toys and instruments in both conditions in their own way and their own pace. Many children were also extremely controlling and dominating when considering what to play and how to play with the therapist. Through their own way of dealing with the therapist’s interpersonal demands, they ensured their own autonomy. This probably is directly connected to what appeared to be the children’s hypersensitivity and vulnerability with low tolerance levels over what they might have felt as ‘losing control over what went on between themselves and the therapist’. What could have been slightly frustrating events were often magnified as major catastrophes by some children (see clinical vignette of C, E, F, and K). This is consistent with some of the psychoanalytic findings (Alvarez, 1992; Tustin, 1990) with autistic children.

This is not to say that there was no improvement concerning self-emotional regulation as well to the level of cooperation from children. As the sessions progressed, most children’s level of cooperation towards the therapist’s interpersonal demands and their level of self-emotional regulation improved as evidenced in ‘Response to Requests’ measures and in individual case studies in Chapter 6. Improvement of joint attention skills in children appeared to be positively related to self-emotional regulation and the level of cooperation of each child in this study. As evidenced with data presented up to now, children’s levels of cooperation and self-emotional regulation developed better in music therapy than in free play. The observational findings suggest that the ability (or inability) to cooperate and follow another person’s intention and interpersonal demands is a good indicator for both assessing childhood pathology and evaluation of relevant interventions.

7.2.1.6.3 “Mummy” phenomena in music therapy

While some children called the music therapists “mummy” during the music therapy condition (see clinical vignette of B, E, H, K), none of children called the therapist “mummy” in the free play condition. This was quite striking when it happened although the context within which each child addressed the therapist “mummy” in music therapy sessions was different from one to another. This is somehow consistent

with what music therapists in improvisational music therapy have claimed so far that early human communication is quite similar to the process of improvisational music therapy with some populations, particularly with pervasive developmental disorders and the intellectually disabled (Brown, 1994; Heal Hughes, 1995; Holck, 2002a, b; Pavlecevic, 1990, 1997; Robarts, 1996; Wigram & Elefant, 2006; Wigram & Gold, 2006). The characteristics of non-verbal, sound communication together with an active coordination of movement and eye contact with affect sharing qualities in music therapy not only mirrors what happens between the mother-infant during the early non-verbal interaction phase, but also magnifies and intensifies such affective mother-infant interaction like qualities through the well-measured and controlled use of ‘musical attunement’.

Two children (B, K) were not fully verbal when they addressed the therapist as “mummy”. Even though B knew many words, he did not previously show communicative intent with language. These two children had somewhat difficult relationships with their own mothers before they entered the clinical trials. Both mothers had been clinically depressed for some time and expressed their own feeling of inadequacy in their child caring skills, not for the older child, but for their autistic child. During the period of when children addressed the therapist as “mummy” was when they also began to address their own mothers as “mummy”.

Two children (E and H) had functional language skills so that they were able to have simple conversations with people. E and H developed very well and they also developed a strong attachment to the therapist in music therapy. They knew the difference of ‘Sunsangnim (the therapist)’ and ‘mummy’ so that they were able to call the therapist “Sunsangnim” in a normal music therapy situation. The moment at which they called the therapist “mummy” was when they were fully engaged with the therapist in a mutual music making process, and it seemed to be a ‘Freudian slip of tongue’ that they called the therapist “mummy” almost unconsciously. For example, when H was fully engaged and excited, he called the therapist “mummy” with excited voice, then realized what he said and then corrected himself the following time by calling the therapist, “mummy sunsangnim”.

The phenomena of calling the music therapist “mummy” seemed to represent more than just words. It showed the degree of the therapeutic relationship, and the attachment shown by the child to the therapist and the improvisational music making process certainly appeared to influence such phenomena.

7.2.1.6.4 Development of cross-modal interaction in music therapy

Five out of total ten children (A, B, G, H, J) began to initiate and develop strikingly similar patterns of initiating interaction, generally starting from the middle to late period of the music therapy trials. These children were developing very well in music therapy except one child (J). J, who had free play first, and music therapy later, initially responded very well to gestural interaction with the therapist in free play sessions, and then continued to develop this type of interaction during the music therapy condition. However, in his case, he did not develop a fully developed cross-modal interaction.

Although not everybody developed fully to the level of cross-modal interaction, their patterns of development were as follows. First, they were fully engaged musically and the mutual music making process between the child and the therapist was developing very well. Second, they began to initiate gestural interaction either after music playing, or in between music playing using their limbs, or sometimes with beaters making some movements in the air while closely monitoring the therapist's reaction, therefore prolonged eye contact occurred simultaneously. They looked excited when the therapist either mirrored, or imitated their gestures. Third, they began to combine musical-gestural interaction together with active vocalization and movement and developed further complex patterns of interaction. For example, in H's case, he was using his imagination pretending that he was drawing something in the air within this cross-modal interaction. A few children even became quite provocative and naughty towards their therapist during such interaction, which is a strikingly hopeful sign for children with autism.

Within the 12 weeks of music therapy trials, those children showed marked development in their musical interaction. This 'cross-modal interaction' involved "instrumental playing, gestures (or movement) and vocalization". When that happened, their voices were more animated, which was appropriate within the context. When we consider vocal atypicality in autistic children (Arnold et al, 1993; Sheinkopf et al, 2000) so that even their mothers had a difficulty of recognizing the affective context of their child's vocalization, this was also hopeful sign.

The finding about the development of cross-modal interaction in music therapy is consistent with Holck's finding that she also recognized that movement, gesture, vocalization and eye contact were also fundamental aspects of interaction as the musical figure (Holck, 2002a, 2004a) in her PhD research.

7.2.1.6.5 Some development of pretend play in free play condition

The phenomena of pretend play were not the focus of this study. Nevertheless, there were many instances of pretend play in children in the free play condition. The area of pretend play in autism is controversial due to differing understanding, theoretical perspectives and definitions used among autism researchers. Therefore, the author decided to borrow the definitions from Libby, Powell and Jordan (1998) study and described the findings accordingly.

Although the overall outcome concerning joint attention and interactive state between the child and the therapist was better in music therapy, there was more observable development of pretend play in free play where some children were able to develop some levels of symbolic play (A, B, E, H, J, and K). A few children were even able to play out their issues and concerns through doll play as well (B, J). This was the most appreciated aspect of the free play sessions by mothers.

There was also some pretend play such as ‘hide and seek’ a ‘peek-a-boo’ type of play developing, as well as an apparently symbolic level of playing in music therapy where J, for example, was playing out the “thunder and lightening” game with the drum and the cymbal. Robarts (1996) also reported the development of ‘symbolic play’ (hide and seek) in the case study of Colin in improvisational music therapy where she described the theme of ‘losing and finding, or disappearing and re-appearing’ in connection with Colin’s state of tension and resolution in music therapy. However, a pretend, or symbolic level of playing occurred more clearly in the free play session, even though many of these plays were more solitary in nature rather than a jointly engaged play whereas ‘hide and seek’ is inherently relational play.

In order to clarify these terms, the author adopted the definition of terms from Libby, Powell and Jordan’s study (1998). ‘Pretend play’ is an umbrella term for two subcategories of play behaviour, functional and symbolic play. Functional play is ‘using an object as its function denotes’. For example, pushing a toy car up and down on the floor and making a “brmmmm” sound could be interpreted as functional play. Libby, Powell, and Jordan (1998, p.487) stated; “*symbolic play appears later, from 20 months, and involves treating an object or situation as if it is something else. Leslie (1987) described three forms of symbolic play: (a) object substitution – using an object as if it is something else (e.g., using a brick as some soap), (b) attribution of false properties – attributing properties to an object as if they exist (e.g., pretending a doll is ill), and (c) reference to an absent object – making a reference to something as if it is present (e.g., driving a truck over an invisible bridge)*”.

The finding of this study was partly consistent with Libby, Powell and Jordan’s finding in 1998. They compared children with autism, Down syndrome and typical

development with verbal mental ages of approximately 2 years. They found that there were some unusual atypical features in autistic children, but their symbolic play skills were not very absent. They found that autistic children displayed predominantly sensorimotor play, which was also often observed with children in this study.

The children in the study by Libby, Powell and Jordan (1998) also showed some difficulties in functional play although the amount of functional play did not significantly differ from the comparison groups. Williams et al (2001) looked at functional play in children with autism that their finding was consistent with the findings of this study. They also compared autistic children with developmentally matched children with Down syndrome and typical infants. They found no group differences in the proportion of total playtime spent in functional play, and in the number of functional acts performed by children with different conditions. However, there were striking qualitative differences. The autistic children's functional play appeared to be less elaborated, less varied, and less integrated than that of the control groups. In this study, children appeared to play repetitively with certain toys (e.g., spinning tops), or certain situations (e.g., 'Ding Dong game'). However, the level of the children's play was also developed to a certain degree over time, perhaps because of the presence of the therapist who was paying full attention to them, and elaborating with them.

In the study by Libby, Powell and Jordan (1998), autistic children had difficulty in producing 'symbolic play', but five out of nine children demonstrated some level of an 'object substitutions' type of symbolic play over other types of symbolic play. In this study, 'object substitutions' did not occur often. A few children displayed 'attribution of false properties' in their play, such as 'mummy going to the market, having dinner together' (A's case), 'doll having rest in bed' (J's case). On a closer look, however, this play had a rather limited concrete quality that was directly connected to the child's experience outside of the therapy. 'A' spent most of the time with his mother and was very familiar with his mother going to the market, or preparing dinner at home. When J played 'doll having rest in bed', he had an accident, which resulted in the need for a lot of rest at that time. It seemed children were able to play out what happened and learned in their real life in their play. Some were even able to play out their own issues in toy play. B had a difficult relationship with his mother and he used to drop the female adult doll from the top of the dollhouse to the floor. He also made clear gestures of making dolls fly through the air when he heard that he would continue to see the therapist after the clinical trials were over. It seemed (although at limited levels) that some of the children were able to express what happened in their lives, and what concerned them as

well through this form of play.

Segal (1957/1981, p.52), who belonged to the group of British object relations school, explained symbol formation as ‘an activity of the ego attempting to deal with the anxieties stirred by its relation to the object’. In other words, loss, or separation of the object triggers symbol formation. Klein appreciated the symbolic value of children’s play, which she considered as equivalent to dreams; “*in their play children represent symbolically phantasies, wishes and their experiences.*” (Klein, 1926, p. 134).

Defining what symbolic play is and whether autistic children truly have symbolic representation in their minds to play out remains to be established. However, the findings of this study indicated that some high-functioning, verbal children were able to play out some of their own experiences in their toy play. ‘H’ who was also one of the high-functioning autistic boys, was even able to imagine and send his parents to space in a spaceship (in his toy play). Since H was an ardent reader of books, he probably read something about space and got fascinated with the idea of spaceship and space, and one day combined these stories within his play. Although many children displayed the usual autistic repetitive play repeatedly, these occasions where they showed some signs of development in a symbolic level of play, mothers were somehow touched and became hopeful for their child.

7.2.1.7 Salient musical elements in musical synchronicity and children’s preference for objects in both conditions

The salient musical elements in musical synchronicity are not about the therapist’s music only, as it refers to the common musical elements between the child and the therapist that enable them to be engaged together musically. Therefore, this section primarily deals with research question 2: “*Are there any observable musical features in improvisational music therapy that characterize the engagement and maintaining of joint attention of the child and the therapist both within and across cases?*”

Children’s preferences for objects in both conditions were recorded by the author through examining four minutes of selected sessions in both the unstructured and structured part. Although each individual might react differently from each other, the findings are clinically relevant as can give some guidelines to a music therapist in the initial stage of music therapy with children.

Main findings

For the salient musical elements in music synchronicity, it was designed for the music therapy condition and not for the free play condition. Therefore, the results were

expected to be favoured towards music therapy. There were five categories of musical elements; rhythm, dynamics (intensity, accent and volume included), gesture (movement included), vocalization and melody. Statistical analysis revealed that rhythm and dynamics were two of the most common salient musical elements between the child and the therapist within musical synchronicity events. Some may question the result and point out the fact that many music therapists use either simple or rich harmonization or melody in their musical interaction with children. The author was not looking for what music the therapist used during musical synchronicity. She was more interested in what elements of the music connected the two participants together and maintained their joint attention and engagement. For example, when a child hit a drum repeatedly, and the therapist accompanied the child with the piano creating a melodic line with the right hand and harmonization with the left hand, the most salient musical elements that connected these two persons together could be rhythm and dynamics. As discussed in a previous section (7.2.1.6.4) and Chapter 6, when children were relatively well-engaged showing some levels of spontaneity in musical interaction with the therapist, approximately in the middle of (four to seventh session) the clinical trial period, gestural elements in musical interaction stood out as one of the important elements between the child and the therapist. Vocalization came in fourth position and melody turn out to be the least salient musical element in this study. Although musical synchronicity was a rare event in free play, the results came out in the same order as in music therapy in free play condition (see figure 5.26).

Figure 5.27 presented the pooled results of children's preference of objects in both conditions. The most selected instruments were; 1) horns and whistles; 2) piano; 3) timpani drum; 4) vocalization; 5) cymbal; 6) xylophone; 7) handballs; 8) chroma harp; 9) guiro; 10) gesture and movement, 11) tone bars. The three least selected instruments were egg shakers, finger cymbals and paddle drums.

The most selected toys were; 1) doll house; 2) cars; 3) top; 4) peg (wood) kitchen play set; 5) vocalization; 6) bulldozer; 7) puzzle; 8) lego; 9) dump truck; 10) play dough; 11) robot. The least three selected toys were small balls, big balls, and gesture/movement.

As stated in Chapter 5.6.4.2, the top most selected objects in both conditions came out as a surprise for the author, namely horns, whistles and the dollhouse. Probably it was due to the preconception and certain prejudice the author had before the result came out. The Doll's house choice was more a surprise than the horns and whistles, since autistic children were not often reported to play with dolls (human shape

objects).

Relationship with previous findings

To the present knowledge of author, there has been no controlled study carried out to examine the salient musical elements in musical synchronicity events between the child and the therapist and to examine the children's preference of objects in the therapy. However, there are many case studies where a music therapist recorded the details of the children's choice of instruments and the therapist's choice of instruments, and how musical interaction developed within one session and over the sessions. Alvin (Alvin & Warwick, 1991) often used her own cello in working with children, while Nordoff (Nordoff & Robbins, 1971a, 1977) used the piano for the most part, while children often played the drum and cymbal. Wigram (2002) described the piano duet with Joel. Robarts described (1996) Colin using the snare drum and the cymbal, and herself the piano and her own voice. It seemed that the therapist using the piano and the child using the drum and the cymbal is a frequent choice reported in the literature. This is, of course, only the author's impression, not the results of a detailed search and analysis, and can only be interpreted from those therapists who have published on their work. Events of musical synchronicity occurred frequently in these case studies as well where the therapist tuned into the way the child was, or played using 'controlled musical attunement'. However, detecting or guessing the salient musical elements from those case studies was rather impossible.

The findings were based on very small samples and may be biased by the initial selection of instruments, and toys in both conditions by the author. However, the results still offers clinically relevant facts, which can be easily applicable for everyday practice and future study.

7.2.2 Limitation of session analysis

Undertaking clinical study with complex session analyses methods inevitably brings difficulties that influence the reliability and validity of the study. During the clinical trials, several unexpected limitations emerged. As the study involved human subjects in a real world, some life situation variables were often beyond the control of the researcher, which may have influenced the results of the study. The first section here will discuss limitations of the results, the second section the limitations of the method, and third section the limitation of clinical trials.

7.2.2.1 Limitations of results

For the analysis of sessions, the 1st, 4th, 8th, and 12th sessions were selected, with four minutes sampled from both the first half (unstructured part) and second half (structured part) in order to find out whether there were patterns of development over time. Session analysis consisted of frequency and duration data comparing music therapy with free play. As these sessions were pre-selected, the findings may represent particular events at a certain period of time, rather than giving full representational results of what happened during the clinical trial. Since the author recorded events and clinical behaviours in each of the 10 children's sessions in both conditions in real time, those selected sessions did rarely capture what she considered clinically relevant 'golden moments' where children showed either some kind of therapeutic breakthrough, or in depth emotional-musical engagement with the therapist. The author also noticed that sometimes nothing particular happened within those selected times and sessions when children were in transition from one activity to another. However, the transition time was usually short. The fact that those selected sessions often missed out on what the author considered 'golden moments', and also consideration of 'transition time' suggests that the results are quite conservative, and yet more convincing.

As the primary coder was the author who took the role of both the researcher and the therapist, the coding may have been favoured towards music therapy. Nevertheless, the results of the analysis were supported by the very high inter-observer reliability. For inter-observer reliability, an intraclass correlation coefficient (ICC) was used since unlike a simple correlation coefficient, ICC does not tend to over-estimate the agreement, which makes inter-observer reliability more convincing.

As the study involved only 10 subjects, one has to consider small sample size when interpreting the results. To what extent effects of improvisational music therapy has on the joint attention and social interaction behaviours of children with ASD remains to be established by replication of the study with larger samples, also by follow-up studies.

Throughout the study, a series of Analyses of Variance (ANOVAs) were used to examine whether the magnitude of changes was clinically meaningful. Significant differences were found when comparing the music therapy condition and the free play condition, and most analyses of target behaviours were in favour of the music therapy condition (except imitation). Some target behaviours (Initiation of Engagement, Emotional Synchronicity, Joy) showed significant differences comparing session order showing certain pattern of progress in music therapy and free play condition, and also session parts showing the level of differences in children's responsiveness towards

different therapeutic approaches. Some reached almost significant levels such as ‘musical synchronicity duration’ in selected sessions and session part, ‘turn-taking duration’ on selected sessions. These may have reached a statistical significance if given a larger sample.

The design of the study did not provide a statistical measurement for “Common features in clinical vignettes of individual cases (7.2.1.6)” as some of those aspects were unpredicted clinical phenomena. The contents of 7.2.1.6 were based on the author’s detailed clinical record in real time of almost every session of the 10 subjects in both conditions. Therefore, these are the subjective observational records discussed and speculated, which remain to be proven further.

7.2.2.2 Limitations of methods

Limitations of the session design: For two of the children, who had shorter attention span, it was difficult to keep them for more than 20 minutes in the session (C in both conditions, and G in the free play condition). Others were resistant to ending the session after 30 minutes and wanted to stay longer (cases of A, B, H). However, in most cases, half an hour session proved suitable for this age group.

In the early period of clinical trials, the therapists often found it hard to recognize the second half of the sessions as the structured part due to the level of concentration they paid towards their on-going interaction with the children. As a result, they sometimes missed the right time to introduce the structured part in the second half of the sessions. Therefore, with the first two children, the structured part was sometimes introduced rather later than expected. After experiencing such methodological loopholes, the author devised the ‘signaling method’ that sent a ‘sound signal’ to the therapist by blowing the Chinese horn exact halfway through the session. After using this sound signal, therapists recognized the second half of sessions more readily and conducted sessions as planned. Therefore, some of the methods took time to adjust to the research situation.

7.2.2.3 Limitation of clinical trials

Limitations of subjects: There was a high rate of dropouts as stated before in Chapter 4 and the reasons were clearly stated.

Two children were not in an optimal condition for the study (C and J). C attended clinical trials after intensive day work at the early intervention center, which always left him very tired and irritable throughout the whole clinical trial period. J was under-ADHD medication during the music therapy condition, which was explained in

Chapter 6. This change of medication qualified for exclusion criteria, however in line with the Consort Principles for reporting experimental studies, and considering the relatively long-term period J was in therapy, the results from subject J were retained and included in the analysis to avoid introducing a positive bias artificially increasing the benefits of the treatment by excluding such data.

Limitations of human resources: There were unexpected events, especially in the early stages, as well as throughout the clinical trials. Due to a unfamiliarity with the complicated DVD recording system in the clinic, the research assistant made mistakes such as not pressing the recording button for the session, or forgetting to check the sound mixer that resulted in either ‘no recording’ or ‘recorded without any sound’. This happened with the first child, especially 4th and 8th sessions. Therefore, in this particular case, the fifth and ninth session were selected to be analyzed. The author became very cautious about this problem, therefore, checked the system thoroughly before each session started and trained assistant carefully.

There were, however, also unexpected dropouts of research assistants, which created a temporary crisis of some degree. For example, two research assistants suddenly dropped out in the middle of the trials without giving the author any prior notice. The author found out that they were going through some personal crises and changes in their lives. In such cases, there was no trained person available, who could assist with the camera work for the sessions. These were practical limitations that were beyond the control of the researcher. Three mothers volunteered, or agreed to assist with the camera work. The author had to show them how to manipulate the camera controller and let them assist her, while she was carrying out the therapy session with their child. As expected, the quality of the camera work of those sessions recorded by the mothers was not as good when compared with the work done by well-trained assistants. The mothers were not able to use sensitive camera controller techniques such as ‘zoom in and out’, and to change the first to the second camera, when needed. However, the recording was still analyzable, although sometimes the mother’s camera work missed the sight of their child or full frontal view of the child for a while. These circumstances were within the realm of ‘real world’ research.

Limitations of equipment: Two dome cameras were installed on the ceiling of the therapy room in order to minimize the intrusion of the third person filming the session. The cameras were operated by the camera controller in the waiting area. Although the cameras were equipped with high technology as described in Chapter 4.4.3.2, it was almost impossible to capture both the child and the therapist’s frontal facial expression all of the time. The research assistant was instructed to move the

camera along with the child's frontal upper-body view with recognizable facial expression. When the child was constantly moving, the zoom-out technique was used for a long shot in order to capture the child reliably. Sometimes, switching one camera to another and re-locating the camera into the view of the child took more than five seconds, but hardly more than 10 seconds were ever lost. As the research assistant became more skilled with the camera controller as sessions went on, there were less time lost when switching the cameras. However, one should take into account that these things happen in real life research. Due to several factors, rare moments of camera losing the child occasionally occurred, but not to a significant degree. Therefore, all these circumstances did not significantly affect the general coding of the DVD.

Limitations of the clinical protocol: The treatment manual was used throughout the clinical trials. In the early stage of the clinical trial (the first one month), however, the author recognized one therapist's unwillingness to introduce the structure in the second half of the sessions. It turned out that this therapist had a personal resistance towards imposing structure on children, as she had worked for long time in a 'child-centred way'. She also found difficult to introduce structure when she saw the child displaying defensive behaviours to the structured part of the sessions. It took about a month for this particular therapist to settle down and to get used to the structure of the clinical trials. After this initial period, she found the right balance of how to introduce modeling and turn-taking activities sensitively enough and still working within the child's focus of attention, interest and level of tolerance.

7.2.3 Clinical applicability of session analysis in practice

The session analysis of DVD material in this study involves complicated and time-consuming work that it would be very hard to apply to everyday practice in clinical work. However, some aspects of session analysis can be selected and be applied into everyday clinical practice for evaluation of the improvisational music therapy process with children with severe communication disorders, including autism and learning difficulties. These will be discussed in three sections. First, the use of recording equipment; second, the use of treatment manual; third, the use of target behaviour analysis defined in the study.

7.2.3.1 Recording equipments

In order to carry out session analysis based on observable and measurable changes of behaviour in children, clinicians need well-functioning recording equipment in their clinic and the means to operate this recording equipment appropriately, while

they themselves are attending to actual therapy sessions. One can use the likewise DVD recording system described in chapter 4 in the study, or one can also use a handheld-video camera and have a third person present in the session. There are both advantages and disadvantages to either condition. When one has a DVD recording system operated outside of therapy room, it is assumed it would be less intrusive. However, sometimes it is hard to get the exact facial expression of the child if the child moves around most of the time. On the other hand, having a third person in the therapy room may influence the dynamic of musical interaction between the child and therapist. Careful consideration on what is available and not, and the possible implications of the clinician's choice should be thought over.

7.2.3.2 The use of treatment manual

The treatment protocol of this study is not a strict step-by-step guide to how to apply improvisational music therapy to autistic children. It has two distinctive simple structures; the first is to allow the child to lead the session, starting with the therapist's well-measured 'musical attunement' to the child's state, focus of attention, interest and tolerance level; the second is to lead the child by sensitively imposing simple structure via modeling, or turn-taking activities within the child's state, focus of attention, interest and tolerance level. As the principle of the treatment protocol derived from the tradition of improvisational music therapy, psychodynamic approach and theories of infant developmental psychology, the application of a treatment protocol is a flexible procedure, involving mutual attunement, responsiveness, and reactivity of the therapist and the child.

The general direction of the treatment protocol may be applicable not only to the autistic population, but also to children and adolescents with a wide range of disorders or illnesses that can be treated through music therapy. The effects of the treatment protocol may depend on the therapist's clinical experience and intuitive application to each individual client.

7.2.3.3 Analysis of target behaviours and coding guidelines

As there are so many target behaviours in both frequency and duration measurements, it may not be applicable to measure all of them as the author did in the study. It may be more manageable and applicable to select a few most clinically relevant and interesting target behaviours, in measures of either frequency, or duration alone.

For the researcher working with the autistic population, spontaneous eye

contact, emotional synchronicity and initiation of engagement by the child when there was the occurrence of joy events, appeared as a clinically valuable and relevant fact and information when working with children with autism. These are motivational aspects for the development of joint attention skills in improvisational music therapy, which are often reported as missing, or as deviant aspects in autistic children's play with another person. These aspects are also long-claimed to gain therapeutic benefits from the use of improvisational music therapy since the early pioneering work of Juliet Alvin, Paul Nordoff and Clive Robbins.

However, clinicians need to bear in mind that the basic work of understanding and applying coding guidelines will take quite a while. Most definitions of target behaviours in the coding guidelines appeared to be clear, but applying them to each individual's overt behaviour will not be always clear. Even overt behaviours are interpretable and there is always room for subjective judgment and decisions be involved.

Applying session analysis methods to everyday clinical practice may be far-fetched since the methods require not only extra time and human resources, but also personal effort to self-train in such methods. However, clinicians who are planning any clinical research involving clients with developmental and communication disorders including autism, may find some general directions and guidelines from this study, including treatment protocols, coding guidelines and target behaviours, useful and relevant to their study. The author hopes that the efforts taken in this study will inspire others to produce evidence based clinical studies that will be well documented carefully analyzed and continue to contribute to the understanding and growth of outcome studies in dealing with autistic and other children in improvisational music therapy.

7.3 Conclusions and final thoughts

Returning to the main research question; “do children show observable and measurable changes in joint attention behaviours?”, what the study told us was “yes, they did”. The study offered, however, a wide and complex range of both qualitative and quantitative results with a lot more potential and implications than the author expected. This is due to the broadly defined working definition of joint attention - ‘an interactive state between the child and the therapist where they share focus of attention’ – encompassing social interaction between the child and the therapist. With this working definition as the principle of the study, the author investigated joint attention behaviours

of autistic children in two comparison conditions - improvisational music therapy and free play employing both standardized and non-standardized tools of measurements.

The results from both standardized measurements (the PDDBI and the ESCS) and non-standardized measurements (session analysis) were generally in favour of music therapy over free play. The MPIP also offered a general tendency in how the mothers played with their child at home situation that despite some mothers were able to lower their degree of directiveness, most mothers remained quite directive and controlling towards their child in their free play at home situation.

The PDDBI was used to look at both parents' and professionals' perception of improvement in joint attention related behaviours in children. The findings suggested that the mothers' scores reflected more of their own expectation, sometimes unrealistic hopes and heart-breaking realizations of the severity of their child's pathology, while the scores of professionals were clearly more objective than the mothers. Although the PDDBI was proven as a useful and informative intervention evaluation tool, which was easy to apply in clinical practice, the results of this finding taught us that any type of informant based rating scales would inevitably reflect some level of personal bias (the person's knowledge, expectation and understanding, etc) of the person who is scoring the scale. Therefore, interpretation of the results needs to be more careful considering personal circumstances of each case.

The ESCS, on the other hand, was a semi-structured non-verbal early communication measurement, which turned out to be more reliable, and which was more consistent with the results of the session analysis. The most remarkable finding of the individual items of the ESCS was 'Initiation of Joint Attention Lower behaviour (IJAL)' consisting of eye contacts. It was proven from both the ESCS and session analysis that improvisational music therapy promoted spontaneous joint visual attention among other aspects of early non-verbal communication skills far effective than free play. As the process of music therapy promoted simultaneous coordination of 'listening', 'looking at the therapist' and 'responding' and 'engaging', the results suggested that improvisational music therapy facilitated social learning of children with ASD.

Perhaps, the most clinically relevant and important findings were 'motivational aspects' of musical interaction between the child and the therapist that the process of improvisational interaction produced more 'joy' and 'emotional synchronicity' events

than free play, which probably influenced the degree of spontaneous ‘initiation of engagement’ behaviour of the children. The patterns of results in ‘Joy’, ‘emotional synchronicity’ and ‘initiation of engagement by the child’ were more, or less synchronizing together. While the values of each selected session were increasing over the sessions in music therapy, that of free play were inconsistent. There were markedly more ‘joy’ ‘ES’ and ‘IE’ events recorded in the unstructured part than in the structured part, suggesting that children were happier, more able to share their affects with the therapist and showed more initiatives when they were leading and controlling the interaction with the therapist, rather than when the therapist put interpersonal demands on them. This aspect of the results clearly linked to the responsiveness to ‘Initiation of Interaction’ by the therapist. ‘Positive (compliant) responses’ were markedly more in music therapy than in free play, and ‘no responses’ were twice as frequent in free play compared to music therapy. This suggested that children with ASD displayed more cooperative and interactive behaviours in music therapy than in free play. The findings were not only consistent with recent autism studies (Escalona et al, 2002; Lewy & Dawson, 1992; Siller & Sigman, 2002; Watson, 1998), but also supported the long-lived claims of improvisational music therapy, promoting self and emotional expression, emotional communication and social interaction by providing concrete, scientific and clinical evidences. This is the main contribution to the knowledge of this study at present time. The implications of these findings for clinical and therapeutic direction suggest that this study provides a different way of viewing the usefulness and value of less directed and more child centred approaches. Findings of salient musical elements in musical synchronicity events between the child and the therapist and most selected objects in both conditions have contributed to the field to a lesser degree.

This study employed a repeated measures ANOVA and calculation of effect sizes to examine whether the magnitude of changes was clinically meaningful. While effect size of the total ESCS was medium to large range, this study revealed how statistically vulnerable a small sample study is, especially in the case of the PDDBI and sub-group analyses results. There were indications that both parents and professionals recognized more improvement in joint attention related behaviours in children after music therapy than after free play. There were also indications that children who were verbal, high functioning, younger, and with less severe form of autism, responded better with more consistently positive results to improvisational music therapy. However, statistical analysis did not find a significant difference between each comparison conditions. Again, as this study involved only 10 subjects, any conclusive evidence

remains to be established further.

Direction for future study

As a small sample size results in low-test power (i.e., low chance of detecting a significant effect even if the therapy was effective), the direction of future research on the basis of this study clearly involves a replication of the findings on larger samples and correspondingly less dependent variables and sessions to analyze. Clinical research in the field of autism often involves inherently small samples, especially when randomization is applied. The gold standard of RCT⁹ should be pursued in improvisational music therapy in order to ensure recognition in medical and educational fields as a valid therapeutic intervention in autism. One solution for small sample sizes is to employ multi-site studies. The use of well-described treatment manual and well-defined coding guidelines are essential to carry out such studies, as well as good-enough training of the therapists and research assistant to ensure fidelity of treatment. This study may serve as a model for such a future study.

As autism requires comprehensive long-lasting interventions, at times throughout the life-time of each individual, rigorous treatment designs to find out what type of intervention (comparison study between different types of music therapy, or play therapy), intensity of treatment (comparing once a week to twice, or three times a week sessions), for which developmental needs (comparing verbal, high functioning to non-verbal, low functioning children, younger to older children, mild to severe autism) is suited for what individual, should be undertaken.

A personal future research interest lies in the development of ‘cross-modal interaction’ initiated by the child in music therapy. The author also would like to look at different developmental patterns of symbolic play in music therapy and in free play. While the development of symbolic play in music therapy was more or less relational such as ‘hide and seek’ game, that of symbolic play in free play was often solitary ‘object engagement’. Again, when we look at both overall quantitative results and qualitative description of these developments, one should be cautious since this study was based on small samples, not to mention that they were all boys, and Korean!

The findings of this study highlighted the importance of motivational aspects of musical interaction between the child and the therapist and the therapeutic potential of

⁹ ‘Randomized Controlled Trial’

such aspects in improvisational music therapy, which indicated clear therapeutic direction for the therapists who work with clients with severe developmental disorders and communication difficulties, including autism.

Personal reflection on the doctoral research journey

I started this journey with rather ambitious hopes, at times unrealistic fantasies and unnecessary fears. Simply speaking, I had mixed feelings. I loved the challenge the children brought in to the everyday clinical practice, both the unapproachability and approachability of each individual character, and widely different temperaments with wide range of individual capacity. I have struggled and learned with them about myself (how similar and different I am to them) and their world through the gift of musical sharing.

Partly I wanted to prove that improvisational music therapy, the work I have been doing for the last decade, was well-worthwhile, while worrying about possibilities of finding nothing, even worse that I may end up that I am not only unable to prove anything, but it was total waste of time (the children got worse). Like the autistic boy that I have described in Chapter 1 as one of my first autistic clients, who could only manage to stay either very far away, or too close to me, I have oscillated between these two extremes quite a while.

Learning to become a researcher was a slow and painstaking process. For the first year, I felt like a baby, while most individuals in the PhD course looked like giants. They had more clarified and developed minds and thoughts, with more experiences in research. I felt so small for a long time and in a twisted sense of spirit, I still loved the feeling. That was certainly refreshing, delightful and immensely stimulating.

During my presentation at my first PhD Course in Oct 2003, two experts questioned the original design and measurements I was proposing. Dr. Thomas Wosch gave me his opinion that currently available affect measurement (i.e., MAX) was not reliable, and Dr. Ulla Holck commented that ‘joint attention’ was already a big topic without other aspects to the study. This made me narrow down the focus of the study, and work on what was available and reliable standardized measurements that I could get to evaluate the intervention study I was proposing.

The development of clinical research was a test of time and patience. Even though I wanted to fly, I had to learn to stay in the nest so to speak, pay attention to my surroundings first, and not even dream to flap my wings yet in the first six months.

Even the translation and standardization of the PDDBI took almost four to five months, involving the original author, external advisor (a professor of clinical psychology at Seoul National University Hospital), colleagues in special and mainstream education, speech therapy and parents of children with ASD. When almost everything was ready for clinical trials, I had to wait for another four months for the first referral. Through conducting this research, I learned that even this small sample study needed close collaboration with colleagues and research assistants and management skills. Many unexpected dropouts happened on the way, which was well beyond my control. Some dropouts of the research subjects were felt to be quite traumatic, when I saw some good signs of early development in music therapy compared to previous free play sessions. When trusted research assistants did not turn-up without notice on the day of clinical trials, it became a major crisis.

Now, looking back, these were just unexpected variables a real world research entailed. Thankfully, every time when some crisis emerged, there were solutions too. Some mothers volunteered to be surrogate research assistants for such emergencies and I was soon able to find a new research assistant in due time. I am most grateful that none of the therapists dropped out, and saw the work through to the end of the trials with me. Being the researcher, clinician and also the manager of the research team was certainly a challenge. I had to train every member of the research team to work well for me and with me, and then to manage every individual's schedule to work together. Most of all, I learned that earning the professional trust from the mothers was crucial for ensuring research subjects until the end of the trials.

The coding and analyzing procedures of both the ESCS and session analysis were extremely time consuming, which also needed relatively long-term training as well. Sometimes, four minutes of a DVD recording for session analysis took three to four hours analyzing and coding, so that by the end of the day, I felt numbed by the amount of DVD analysis. Paradoxically this made me very happy when I encountered DVD material where there was almost no observable interaction going on between the child and the therapist.

I also learned that nothing comes easy, and that good research requires devotion, hard and painstaking work.

Bruner (1995, p.11) once said, “without a ready ability for joint attention, human beings fall into a grievous state of pathology”. Most of all, I realized that we need a lifetime on-going healthy interaction with other people to complete us as a well-functioning human being. Mundy and Sigman (2006) stated the capacity to coordinate

one's attention with a social partner in relation to a third object, or event starts as early as three to six months of age, and continue to contribute to social interaction, social learning, and social cognition across the life span.

This study taught us that improvisational music therapy was not only more effective in improving joint attention behaviours of children than free play, but also formed the environment where the child's own motivation for interaction and initiatives can be developed further. What was so special about improvisational interaction was that it was possible to share interactive intentions and emotional expressions often in a subtle way within the mutual music making process. Sometimes, the musical negotiation was smooth, mostly when the therapist was attending to the child's lead. Sometimes, the negotiation was stormy and the sessions became a battlefield between the child and the therapist especially in F and K's case in music therapy. Still, even when children were in bad mood throwing a lot of extreme temper-tantrum, they were more relating to the therapist rather than self-absorbed in their solitary object play. Just like what Even Ruud said in his presentation during the May, 2006, Aalborg PhD course, 'music is essentially relational' and autistic children were responding, and probably will always respond to that quality of music.

8 SUMMARY

8.1 English summary

8.1.1 Introduction

The purpose of this study was to investigate the effects of improvisational music therapy on the development of joint attention behaviours in children with autistic spectrum disorder (ASD). Growing research evidence has indicated that autism is a neurodevelopmental syndrome (Dawson et al., 2002; Mundy and Sigman, 2006), and the disturbance in the development of joint attention skills has been identified as syndrome-specific characteristics of the social deficits in children with ASD (Kasari et al, 1990; Mundy, Sigman & Kasari, 1994; Robertson et al, 1999). There are now more and more studies addressing the need for a more extensive understanding of the nature of this disturbance to inform both diagnosis and treatment of the children (Kasari et al, 1990; Joseph & Tager-Flusberg, 1997; McArthur & Adamson, 1996; Mundy, Sigman, Ungerer, & Sherman, 1986).

In improvisational music therapy literature, there are some qualitative studies and many clinical reports demonstrating that ‘the controlled use of musical attunement’ (Wigram and Elefant, 2006) employed by the therapist to the child’s musical and non-musical expression and state promotes the child’s capacity for self expression, emotional communication, and social interaction (Alvin & Warwick, 1991; Brown 1994; Edgerton, 1994; Holck, 2002a; Nordoff & Robbins, 1971a; Robarts, 1996; Saperston, 1973 Wigram, 2002; Wigram and Elefant, 2006). Without the capacity for joint attention, communication and social interaction is not possible. However, to date there has not been a controlled study on this topic in improvisational music therapy.

Main research question and hypothesis

Therefore, the study started with a main research question – ‘do children show observable and measurable changes in joint attention behaviours?’. A main hypothesis was developed that stated: Finely tuned, sensitive and attentive use of improvised music (musical attunement) towards the developmental needs and state of the child with ASD will open and maintain the communicative channel with the child. The child’s ability in joint attention will increase positively over time and musical attunement will play a significant role in improving joint attention behaviour of the child with ASD.

Operational definition of joint attention

Joint attention has been defined differently in many studies from various different contexts. Joint attention in this study is defined as “an interactive state of joint engagement that involves the self (the child), another (the therapist), and objects in musical form (instrumental, or vocal joint engagement), or in play (toys)”.

8.1.2 Methodology

Design

In order to evaluate the research hypothesis and research questions, a randomized controlled clinical study was designed to look at these behaviours in two different conditions, improvisational music therapy and free play. A repeated measures, within subjects comparison design, in which each child had free play sessions with toys as a control condition to compare with improvisational music therapy sessions of the same length and under similarly controlled conditions. Both standardized tools and non-standardized DVD analysis of sessions were employed to evaluate changes in joint attention behaviours. In order to establish consistency in the treatment procedure, a treatment manual was used (appendix 10.1).

Subjects

10 children, all male, age between 3 ~ 6 year old, with clear diagnoses of autistic spectrum disorder without diagnostic comorbidity, were recruited from the dept. of child psychiatry, Seoul National University Hospital and completed seven to eight months of clinical trials each. All subjects were examined by two child psychiatrists, using DSM-IV and ICD-10 criteria and met the diagnostic criteria of autism.

Procedure

During the first interview with the parents and children, the clinical research and the procedure was explained fully to the parents. When the parents agreed to participate in the clinical trials, they were given one week to sign the parent's consent form. Children were randomly assigned into two groups. The five subjects randomly assigned into group 1 had 12 music therapy sessions first, and then 12 free play sessions after, while the other five subjects randomly assigned into group 2 had 12 free play sessions first and 12 music therapy sessions after. Sessions were divided into unstructured and structured parts, each lasting approximately 15 minutes. There were three types of pre, in between, and post treatment measures; the Pervasive Developmental Disorder

Behavior Inventory (PDDBI), the Early Social Communication Scales (ESCS), the Mother Play Intervention Profile (MPIP). For the session analysis, the predefined target behaviours were analyzed using both frequency and duration measurements in selected sessions (1st, 4th, 8th and 12th) in two different sections (unstructured and structured part). The pre-defined target behaviours (dependent measures) in the session analysis included frequency and duration of eye contact, frequency and duration of events of joy, frequency of initiation of engagement by the child, frequency and duration of turn-taking events, frequency of events where the child imitated the therapist, frequency and duration of events defined as emotional synchronicity and musical synchronicity between child and therapist, and frequency of initiation of interaction by the therapist.

For the analysis of data, repeated measures ANOVAs were used and effect sizes were calculated in order to find out whether changes were clinically meaningful.

8.1.3 Results and Discussion

The overall results from both standardized and non-standardized measurements were generally in favour of music therapy over free play, indicating improvements in joint attention behaviours of children over time.

There were two standardized measures; the PDDBI and the ESCS. The PDDBI was an informant based rating scale completed by the mothers and the professionals. The findings of the PDDBI- social approach behavior sub-scales suggested that the parents and the professionals recognized improvements in both conditions. While the scores of the professionals suggested greater improvement after music therapy than after play, the scores of the mothers did not indicate consistently in that direction. It turned out that the scores of the mothers often reflected the mother's level of expectation and understanding (also misunderstanding) of their child's pathology, while the scores of the professionals' were quite congruent with the results of the ESCS and session analysis, suggesting the scores of the professionals retained more objectivity. The findings suggested that the informant based rating scales may reflect some level of personal bias, relating to who was scoring the scale, therefore interpretation of such results needs to be carefully considered.

The ESCS was a semi-structured early non-verbal communication measurement, which was more reliable and also consistent with the results of session analysis. The results of repeated measures ANOVAs in the ESCS total scores indicated that the improvement after music therapy was significantly better than after the free play at developing early social communication skills in children with ASD. The effect size was found to be medium to large and at significant level ($p < 0.05$). The most

outstanding results of the individual items of the ESCS were 'Initiation of Joint Attention Lower (IJAL)', consisting of eye contacts. It was proven from both the ESCS and the session analysis that improvisational music therapy promoted spontaneous 'joint visual attention' far more effectively than any other aspects of early non-verbal communication skills. As the process of music therapy facilitated simultaneous coordination of 'listening', 'looking at the therapist' and 'responding' and 'engaging', the results suggested that improvisational music therapy facilitated social learning of children with ASD.

The most clinically relevant and important findings from the analysis of behaviours in the sessions were 'motivational aspects' of musical interaction whereby improvisational music therapy produced 'joy' and 'emotional synchronicity (ES)' events that were more frequent and of a longer duration than free play, which clearly influenced the degree of spontaneous 'initiation of engagement (IE)' behaviours in children. This finding is consistent with social motivation models of joint attention theory (Hobson, 1993; Mundy, 1995; Trevarthen & Aitken, 2001). The pattern of results in 'Joy', 'ES' 'IE' was more, or less synchronized together. While the selected session values were increasing over time in music therapy, those of free play showed inconsistent patterns. There were markedly more 'joy' 'emotional synchronicity' and 'initiation of engagement' events in the unstructured part than the structured part, suggesting that children were happier, more able to express their emotions and to share their affects with the therapist, and displayed more initiatives when they were leading and controlling the musical interaction with the therapist, rather than when the therapist imposed certain type of interaction and made interpersonal demands. This aspect was clearly connected to the responsiveness of children. 'Compliant (positive) responses' were markedly more in music therapy than free play, and 'no responses' were twice as frequent in free play than music therapy. This suggested children displayed more cooperative and interactive behaviours in music therapy. Clinical vignettes of each child also indicated that children displayed more attachment towards the music therapists than the therapists in free play. Therefore, one can speculate that a trusting therapeutic relationship has the potential to modify the responsiveness of children. This study supported the long-lived claims of improvisational music therapy, promoting 'self expression, emotional communication and social interaction'. The implications of these findings for clinical and therapeutic direction suggested a different way of viewing the usefulness and value of less directed and more child centred approaches. This is the main contribution to the knowledge of this study.

Limitation of the study

While the results of the ESCS were encouraging, the study revealed how statistically vulnerable a small sample study is, especially in the case of the PDDBI and sub-group analyses results. There were indications that both parents and professionals recognized more improvement in joint attention behaviours in children after music therapy than free play. Sub-group analysis also indicated children who were verbal, high-functioning, younger (three to four year old), and with less severe form of autism, responded in more consistently positive ways to improvisational music therapy. However, the results of ANOVAs for sub group analyses did not find a significant difference between each comparison conditions. This study contained a number of unexpected limitations that a real world research entails. As this study only involved 10 subjects, drawing any firm conclusions are still premature, and any claims of this study remain to be established through further studies.

Direction for future study

The direction of future research on the basis of this study clearly involves a replication of the findings on larger samples. Therefore, future study in improvisational music therapy should consider pursuing ‘the gold standard of randomized controlled trial’ with larger samples to further support the provisional, positive results from this study, and further consolidate the current recognition of music therapy in medical and educational fields as a valid intervention for autism. This study may serve as a model for such a future study. As autism requires comprehensive and long-lasting intervention, rigorous treatment designs to find out what type of intervention, at what intensity, for which developmental needs, is suited for which individuals, should be also undertaken.

The findings of this study highlighted the importance of motivational aspects of musical interaction between the child and the therapist and the therapeutic potential of such aspects in improvisational music therapy, which indicated clear therapeutic direction for the therapists who work with clients with severe developmental disorders and communication difficulties, including autism.

RESUMÉ

8.2 Dansk Resumé

8.2.1 Indledning

Formålet med denne undersøgelse var at undersøge effekterne af improvisatorisk musikterapi på udviklingen af opmærksomhedsdelende adfærd (joint attention) hos børn med forstyrrelser indenfor det autistiske spektrum, ASD (Autistic Spectrum Disorder). Tiltagende forskningsevidens peger på at autisme er et neuro-udviklingsmæssigt syndrom (Dawson et al., 2002; Mundy & Sigman, 2006), og at forstyrrelser i udviklingen af færdigheder til at opnå fælles opmærksomhedsfokus er beskrevet som syndrom-specifikke kendetegn på de sociale mangler hos børn med ASD (Kasari et al, 1990; Mundy, Sigman & Kasari, 1994; Robertson et al, 1999). Der er nu flere og flere undersøgelser der gør opmærksom på behovet for en mere omfattende forståelse for naturen af denne forstyrrelse i forhold til at præge både diagnose og behandling af børnene (Kasari et al, 1990; Joseph & Tager-Flusberg, 1997; McArthur & Adamson, 1996; Mundy, Sigman, Ungerer, & Sherman, 1986).

I litteraturen om improvisatorisk musikterapi er der enkelte kvalitative undersøgelser og mange kliniske rapporter som påviser, at terapeutens 'kontrollerede brug af musikalsk afstemning' (Wigram & Elefant, 2006) i forhold til barnets musikalske og ikke-musikalske udtryk og tilstand, fremmer barnets evne til at udtrykke sig, til følelsesmæssig kommunikation og til social interaktion (Alvin & Warwick, 1991; Brown 1994; Edgerton, 1994; Holck, 2002a; Nordoff & Robbins, 1971; Robarts, 1996; Saperston, 1973; Wigram, 2002; Wigram & Elefant, 2006). Uden evnen til fælles opmærksomhedsfokus er kommunikation og social interaktion ikke mulig. Indtil videre er der imidlertid ikke gennemført en kontrolleret undersøgelse af dette indenfor improvisatorisk musikterapi.

Forskningsspørgsmål og hypotese

Undersøgelsen tager derfor udgangspunkt i hovedforskningsspørgsmålet: 'viser børn observerbare og målbare ændringer i opmærksomhedsdelende adfærd?'. Der blev udviklet følgende grundlæggende hypotese: Nøje afstemt, sensitiv og opmærksom anvendelse af improviseret musik (musikalsk afstemning), rettet mod de udviklingsmæssige behov og tilstande hos barnet med ASD, vil åbne og vedligeholde barnets kommunikative kanaler. Barnets evne til at

etablere et fælles opmærksomhedsfokus vil stige positivt med tiden, og musikalsk afstemning vil spille en afgørende rolle i forhold til at øge denne evne hos børn med ASD.

Den anvendte definition af fælles opmærksomhedsfokus

Fælles opmærksomhedsfokus er defineret på forskellig vis i mange undersøgelser fra forskellige sammenhænge. Fælles opmærksomhedsfokus i denne undersøgelse er defineret som ”en interaktiv tilstand af fælles engagement som involverer selvet (barnet), en anden (terapeuten) og musikalske objekter (instrumentalt eller vokalt samspil) eller leg (legetøj)”.

8.2.2 Metodologi

Design

For at kunne evaluere undersøgelsens hypotese og forskningsspørgsmål anvendes et randomiseret kontrolleret klinisk forskningsdesign til undersøgelse af denne adfærd i to eksperimentgrupper: improvisatorisk musikterapi og fri leg. Et *repeated measures, within subjects comparison design* hvor hvert barn havde sessioner med fri leg med legetøj som kontrolbetingelse i en sammenligning af improvisatoriske musikterapisessioner af samme varighed og under samme kontrollerede forhold. Både standardiserede instrumenter og ikke-standardiserede DVD-analyser af sessioner blev anvendt i en undersøgelse af opmærksomhedsdelende adfærd. En behandlingsmanual blev anvendt for at opnå overensstemmelse i behandlingsproceduren (appendix 10.16).

Deltagere

10 drenge mellem 3 og 6 år med en entydig diagnose indenfor det autistiske spectrum uden diagnosticeret co-morbiditet, fra børnepsykiatrisk afdeling ved Seoul National University Hospital, deltog hver i 7-8 måneders klinisk vurdering. Alle deltagere blev screenet af to børnepsykiatere ud fra DSM-IV og ICD-10 kriterier og mødte kriterierne i forhold til autisme.

Procedure

I et indledende interview med forældre og børn blev den kliniske undersøgelse og forskningsproceduren forklaret udførligt til forældrene. Hvis forældrene gav tilsagn til at ville deltage i de kliniske undersøgelser, fik de en uge til at underskrive samtykkeerklæring. Børnene blev tilfældigt fordelt i to grupper. De 5 børn, som tilfældigt blev udpeget til gruppe 1, startede med 12 musikterapisessioner og derefter 12

sessioner med fri leg, mens de andre fem deltagere, som tilfældigt var blevet udpeget til gruppe 2, startede med 12 sessioner med fri leg og derefter 12 musikterapisessioner. Sessionerne blev opdelt i ikke-strukturerede og strukturerede dele som varede omkring 15 minutter. Følgende 3 målinger blev gennemført før, under og efter behandlingen: the Pervasive Developmental Disorder Behavior Inventory (PDDBI), the Early Social Communication Scales (ESCS), the Mother Play Intervention Profile (MPIP). I analysen af sessionerne blev på forhånd definerede adfærdsformer analyseret ved hjælp af både hyppigheds- og varighedsmålinger i udvalgte sessioner (1., 4., 8. og 12.) i to de forskellige dele (ikke-strukturerede og strukturerede).

De på forhånd definerede adfærdsformer (afhængige variable) i sessionsanalyserne omfattede hyppighed og varighed af øjenkontakt, hyppighed og varighed af glæde, hyppighed af barnets initiering af deltagelse, hyppighed og varighed af episoder med turtagning, hyppighed af episoder hvor barnet imiterer terapeuten, hyppighed og varighed af episoder defineret som emotionel synkronitet og musikalsk synkronitet mellem barn og terapeut, samt hyppighed af terapeutens initiativ til interaktion. I dataanalysen anvendtes repeated-measures ANOVA, og effektstørrelser blev udregnet for at gennemskue om ændringerne var klinisk meningsfulde.

8.2.3 Resultater og diskussion

De samlede resultater fra både de standardiserede og ikke-standardiserede målinger var generelt til fordel for musikterapien i forhold til den frie leg, og indikerede en forbedring af børnenes opmærksomhedsdelende adfærd i løbet af undersøgelsen.

Der var to standardiserede måleinstrumenter; PDDBI og ESCS. PDDBI var et informant-baseret spørgeskema som blev udfyldt af mødre og fagpersoner. Resultaterne af PDDBI's sub-skala vedrørende social adfærd viser at forældre og fagpersoner registrerede forbedringer ved begge behandlingsformer. Hos fagpersonerne blev der vurderet et større fremskridt efter musikterapi end efter leg, hvorimod mødrenes svarscore ikke pegede pålideligt i den retning. Det viste sig at mødrenes svarscore ofte afspejlede mødrenes grad af forventning til og (mis)forståelse for deres barns sygdomsbillede, mens fagpersonernes svarscore var forholdsvis sammenfaldende med resultaterne fra ESCS og analysen af sessionerne, hvilket antyder at fagpersonernes svarscore var mere objektive. På baggrund af resultaterne må det formodes at det informant-baserede spørgeskema afspejler en vis grad af personlig forudindtagethed i forhold til hvem der udfylder skemaet. Fortolkning af sådanne resultater må derfor nøje overvejes.

ESCS, et semi-struktureret instrument til måling af non-verbal kommunikation,

var mere pålideligt og ligeledes i overensstemmelse med resultaterne fra analyserne af sessionerne. Resultaterne af repeated-measures ANOVA i forhold til den samlede score af ESCS, viste at fremskridtene efter musikterapien var signifikant bedre end efter fri leg med hensyn til udvikling af tidlig social kommunikation hos børn med ASD. Effektstørrelsen viste sig at være signifikant af middel/stor effekt ($p < 0.05$). Det mest fremtrædende resultat af hver af de individuelle ESCS-punkter var 'Initiation of Joint Attention Lower (IJAL)' bestående i øjenkontakt. Det blev vha. ESCS og analyserne af sessionerne bevist at improvisatorisk musikterapi fremmede spontane episoder med fælles visuel opmærksomhed (joint visual attention) langt mere effektivt end ved nogle af de andre aspekter af tidlig non-verbal kommunikation. Idet musikterapiforløbet fremmede samtidig koordination i forhold til at 'lytte', 'se på terapeuten', 'respondere' og 'engagere sig', antyder resultaterne at improvisatorisk musikterapi fremmer social læring hos børn med ASD.

De mest relevante og vigtige resultater i forhold til klinisk praksis, som blev gjort på baggrund af analysen af adfærd i sessionerne, var motivationsaspekterne i den musikalske interaktion, hvorved improvisatorisk musikterapi bevirkede episoder med 'glæde' og 'emotional synkronisitet (ES)' som var hyppigere og af længere varighed end ved fri leg, hvilket tydeligt havde indflydelse på graden af spontan initiering af deltagelse (IE)' hos børnene. Dette resultat er i overensstemmelse med modeller for social motivation vedrørende teorien om fælles opmærksomhedsfokus (Hobson, 1993; Mundy, 1995; Trevarthen & Aitken, 2001). Der dannede sig et mere eller mindre overensstemmende mønster i forhold til resultaterne af 'Glæde', 'ES' og 'IE'. Idet værdierne fra de udvalgte sessioner viste en stigning over tid i musikterapien, viste værdierne fra fri leg ikke sammenhængende mønstre. Der var markant flere episoder med 'Glæde', 'ES' og 'IE' i de ikke-strukturerede dele end i de strukturerede dele, hvilket antyder at børnene var gladere, var mere i stand til at udtrykke deres følelser og til at dele disse med terapeuten, og udviste flere initiativer når det var dem, der ledte og kontrollerede den musikalske interaktion med terapeuten, end hvis terapeuten pålagde dem visse typer af interaktion og stillede interpersonelle krav. Dette aspekt hang tydeligt sammen med barnets lydhørhed og reaktioner på situationen ('responsiveness'). 'Kompliant (positiv) respons' forekom udpræget mere i musikterapien end i den frie leg, og 'ingen respons' var dobbelt så hyppig i fri leg som i musikterapi. Dette viser at børnene udviste mere samarbejdsvillig og interaktiv adfærd i musikterapi. Vignetter, der beskriver hvert barn i den kliniske situation, viser ligeledes at børnene udviste mere tilknytning til musikterapeuten end til terapeuten i den frie leg.

Man kan derfor tænke sig at den tillidsvækkende terapeutiske relation har potentiale til at ændre barnets lydhørhed og reaktioner på situationen. Denne undersøgelse understøttede de sejlivede postulater om at improvisatorisk musikterapi fremmer 'selvudfoldelse, emotionel kommunikation og social interaktion'. Betydningen af disse resultater for klinisk og terapeutisk styring lægger op til en anden måde at betragte betydningen og værdien af mindre styrende fremgangsmåder som tilrettelægges i forhold til det enkelte barn. Dette er den vigtigste konklusion i denne undersøgelse.

Undersøgelsens begrænsninger

På trods af at resultaterne fra ESCS var opmuntrende, viste undersøgelsen hvor sårbart et lille deltagerantal er i forhold til de statistiske udregninger, specielt hvad angår PDDBI og resultaterne af sub-gruppe analyserne. Der var indikation for at både forældre og fagpersoner noterede en højere grad af fremskridt i opmærksomhedsdelende adfærd hos børnene efter musikterapi end efter fri leg. Sub-gruppe analyser viste ligeledes at børn som havde verbalsprog, var velfungerende, yngre (3-4 år) og havde en mindre alvorlig grad af autisme, responderede på en mere vedvarende positiv måde i improvisatorisk musikterapi. Resultaterne af ANOVA sub-gruppe analyserne kunne imidlertid ikke bekræfte en signifikant forskel mellem hver af de sammenlignede betingelser. Denne undersøgelse indeholdt et antal uventede begrænsninger som det kan forventes af "real world research". Da denne undersøgelse kun omfattede 10 deltagere, er det for tidligt at drage afgørende konklusioner, og enhver slutning fra undersøgelsen må begrundes i yderligere forskning.

Anvisninger for videre forskning

På baggrund af denne undersøgelse vil anvisningen for videre forskning tydeligvis omfatte en gentagelse af forsøget på et større antal deltagere. Fremtidig forskning i improvisatorisk musikterapi bør derfor overveje at stræbe efter 'the gold standard of randomized controlled trial' med større deltagerantal, for yderligere at understøtte de foreløbige positive resultater fra denne undersøgelse, og yderligere bekræfte den gængse anerkendelse af musikterapi indenfor medicinske og pædagogiske områder som en valid indfaldsvinkel i forhold til autisme. Undersøgelsen vil kunne anvendes som en model for en sådan fremtidig forskning. Da der i forhold til autisme er behov for omfattende og længerevarende forløb, bør der foretages strikte behandlings designs for at afklare typen af intervention, intensitetsgrad, hvilke udviklingsmæssige behov de er rettet imod, og hvilke individer den er egnet for.

Resultaterne af undersøgelsen henleder især opmærksomheden på motiverende

aspekter af musisk interaktion mellem barn og terapeut og de terapeutiske potentialer af disse aspekter i improvisatorisk musikterapi, hvilket viste tydelige terapeutiske anvisninger for terapeuter som arbejder med klienter med svære udviklingsmæssige forstyrrelser og kommunikative vanskeligheder, herunder autisme.

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